United States Court of Appeals

for the

District of Columbia Circuit

TRANSCRIPT OF RECORD

BRIEF AND APPENDIX FOR APPELLANTS

IN THE

United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA

STATES
COURT OF APPEALS FOR THE
DISTRICT OF COLUMBIA
FILED DEC 10 1942

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No. 8309

JOHN S. THOMPSON AND HAROLD J. McVEY,
Appellants,

v.

CONWAY P. COE, Commissioner of Patents,
Appellee.

Appeal from the District Court of the United States for the District of Columbia.

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PRESS OF BYRON S. ADAMS, WASHINGTON, D. C.

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APPELLANTS' BRIEF.

JURISDICTIONAL STATEMENT.

This is an action in equity by John S. Thompson and Harold J. McVey, Appellants, who are inventors and applicants for United States letters patent, to authorize Conway P. Coe, Commissioner of Patents, to grant a patent upon their application, Serial No. 138,868, filed in the United States Patent Office, April 26, 1937, for a method of cleaning metal preparatory to coating.

The action is brought under the Revised Statutes of the United States, R. S. 4915, U. S. Code, Title 35, Section 63, as amended by Acts of March 2, 1927, March 2, 1929, and August 5, 1939.

The Commissioner of Patents finally refused patent to applicants upon their said application by action of the Board of Appeals of the Patent Office dated April 26, 1940.

The complaint under R. S. 4915 was filed July 20, 1940, in the United States District Court for the District of Columbia (Appellants' App. 1).

The District Court entered judgment dismissing the complaint after hearing on the merits on May 6, 1942 (Appellants' App. 71).

Applicants filed notice of appeal from said judgment on May 28, 1942, and made bond as required (Appellants' App. 72). Record on appeal was docketed June 30, 1942 (Appellants' App. 75).

STATEMENT OF CASE.

The invention is a process for quickly providing upon the surfaces of steel sheets or galvanized or zinc-plated steel sheets a non-metallic rust-preventive and paint bonding coating, such as a phosphate coating. Such coatings are non-metallic compounds usually of iron or zinc or manganese and phosphoric acid.

These coatings constitute an integral part of the surface of the sheet and are formed by a chemical reaction between an aqueous solution of zinc, iron or manganese acid phosphate and the surface of the sheet. The metal sheet to be treated is subjected to contact with the solution either by immersion therein or by spraying the solution thereon. In general, the chemical reaction comprises dissolving metal from the surface of the sheet and its combination with elements of the solution such as phosphoric acid and formation therewith of the water insoluble compounds of iron, zinc, or manganese phosphates, which are at the same time deposited upon the surface of the sheet and become substantially an integral part thereof. These coatings are insoluble in water and therefore retard or prevent the formation of rust. Paint will adhere very well to such coatings and they provide a valuable and widely used means for bonding paint or enamel to the surface of the metal.

The general art of providing phosphate coatings has long been well known and widely practiced. However, before the advent of the invention described in the application for patent, the coatings could not be provided successfully until after the metal sheet had been fabricated or shaped to the final manufactured article. These prior coatings would not withstand the subsequent bending and forming of the sheet into manufactured articles. The coatings would flake off and break away at the bends, leaving the metal susceptible to rust and corrosion and destroying the bond for paint at such places. Coatings of uniform character and color could not be obtained on wide sheets. This failure gave unsatisfactory results in subsequent painting because the variation in color and character of the coated surface reflected through light colored paints and gave a non-uniform appearance where uniformity was desired.

The desirability and advantages of being able to coat the sheets at the rolling mill and prior to performance of fabrication and shaping operations thereon are clear. It would relieve purchasers of the sheets who fabricated and shaped them into the final manufactured article from the necessity of rustproofing those articles after fabrication and of installing such rustproofing equipment in their own plants, or from shipping their manufactured articles out to separate coating plants for treatment. However, if coatings were to be applied at the rolling mill, they must be applied very quickly to avoid holding up production operations, must be such as would withstand subsequent bending of the sheet, and must be of uniform color and texture in order not to detract from subsequent paint finish (Appellants' App. 16, 19-20, 54-57).

The appellants had unsuccessfully worked on the problem; so had the concern they were employed by, Parker Rust-Proof Company, and also the American Rolling Mill Company for whom the appellants were finally able to satisfactorily coat sheets at the rolling mill by the process described in their application for patent (Appellants' App. 15-17, 19, 20-21, 54, 55).

The evidence shows that since its discovery the commercial use of the invention has steadily increased until at the time of the trial below it was used by many of the largest manufacturers of steel sheets (Appellants' App. 57-60).

Specifically, the invention comprises the process of applying water to the surface of the sheet and passing the sheet between rolls that break down the surface tension of the water in the sense that they cause complete wetting of the surface of the sheet by forcing the water into the microscopic pits and crevices in the surface of the sheet, and thereafter promptly applying the aqueous rustproofing solution to the wetted sheet. This is best done by passing the sheets between water wet rolls composed of resilient or semi-resilient materials, such as rolls wound with cloth, or rolls like buffing wheels, or rubber rolls, and then while wet into a tank containing the aqueous rust-proofing solution. The invention is expressed in seven claims Nos. 20 to 26, inclusive, in the application (Appellants' App. 113, 114, 115). Claims 20, 22, and 23, set forth below, are illustrative:

> "20. In the rust-proofing of metallic objects by subjecting the same to the action of an aqueous solution of rust-proofing material, the step of applying water to the object prior to immersion in the rust-proofing solution and breaking down the surface tension of the water by mechanical means to effect a complete wetting of the surface of the object immediately prior to the rust-proofing step whereby said solution will immediately attack the entire surface of the object with substantially equal intensity.
>
> "22. In the rust-proofing of metallic objects by subjecting them to the action of an aqueous solution of rust-proofing compound, and the employment of rolls in the preparation of the object for the rust-proofing step, the step of subjecting said object to a squeezing operation between said rolls in the presence of water whereby said rolls break down the surface tension of said water and completely wet the surface of the same for reception of the rust-proofing solution, and then immediately subjecting said wetted surface to said aqueous solution of rust-proofing compound.
>
> "23. The use of rolls in the rust-proofing of metallic objects by the action of an aqueous solution of rust-

> proofing compound, the step of subjecting the object to a squeezing action between said rolls in the presence of water to effect a complete wetting of the surface of the object preliminary to the action of said rust-proofing compound thereon, and then subjecting said object to the action of said aqueous solution of rust-proofing compound while said surface remains completely wetted."

The inventors and applicants do not know precisely what the process described in their application does to the surface of the metal to make it acquire the fine coating that results. They do know that if the described process is followed, an exceptionally fine, dense and uniform coating, which will withstand bending and shaping, is obtained, while sheets not so treated acquire little if any coating in the time allowed despite thorough previous cleaning.

This was demonstrated before the District Court by specimens of zinc plated steel (Appellants' physical Exhibits 2-10, inclusive), also testimony (Appellants' App. 25-28); and plain steel panels (Appellants' physical Exhibits 11-19, inclusive), testimony (Appellants' App. 28-29); and cadmium plated steel panels (Appellants' physical Exhibits 20-23, inclusive), testimony (Appellants' App. 29-30); and zinc plated and painted steel panels (Appellants' physical Exhibits 28-31), testimony (Appellants' App. 61-64); and also by the physical demonstration of the operation of the process before the Court, in which specimen zinc plated steel panels (Appellants' physical Exhibits 24 and 25) and plain steel panels (Appellants' physical Exhibits 26 and 27) were processed (Appellants' App. 47-53). These exhibits clearly show the remarkable improvement in coating effect produced by treating the panels according to the process described in the application. The improvement in coating obtained on the panels is clearly visible to the unaided eye, and it is verified and amplified by photo-micrographs (Appellants' Exhibits 2A to 9A, inclusive, and 11A to 18A, inclusive; testimony Appellants' App. 31-33, 39), taken* of the corresponding panels at a magnification of 400.

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*Exhibit No.	Type of Panel	Pretreatment before coating	Coating	Appellants' App.
2	Zinc plated steel	None	None	25
3	“ “ “	None	Phosphate	25
4	“ “ “	Rolled wet 4 passes	“	25
5	“ “ “	Alkali sprayed, not rolled	“	26
6	“ “ “	Alkali sprayed, wet rolled 4 passes	“	26
7	“ “ “	Alkali sprayed and brushed, not rolled	“	27
8	“ “ “	Alkali sprayed and brushed, wet rolled, 4 passes	“	27
9	“ “ “	Alkali sprayed and brushed, wet rolled, 1 pass	“	27
10	“ “ “	Top half not rolled, bottom half wet rolled, 4 passes	“	28
11	Plain steel	None	None	28
12	“ “	None	Phosphate	28
13	“ “	Wet rolled 8 passes	“	28
14	“ “	Alkali sprayed, not rolled	“	29
15	“ “	Alkali sprayed, wet rolled, 8 passes	“	29
16	“ “	Alkali sprayed and brushed, not rolled	“	29
17	“ “	Alkali sprayed and brushed, wet rolled, 8 passes	“	29
18	“ “	Alkali sprayed and brushed, wet rolled, 1 pass	“	28-29
19	“ “	Top half not rolled, bottom half wet rolled, 8 passes	“	29
20	Cadmium plated steel	None	None	29-30
21	“ “ “	None	Phosphate	30
22	“ “ “	Alkali sprayed, not rolled	“	30
23	“ “ “	Wet rolled, 4 passes	“	30
24	Zinc plated steel	Top half not rolled, bottom half rolled	“	47-49
25	“ “ “	Alkali sprayed, top half not rolled, bottom half rolled	“	50-51
26	Plain steel	Top half not rolled, bottom half wet rolled, 8 passes	Phosphate	51 and 53
27	“ “	Alkali sprayed—top half not rolled, bottom half wet rolled—8 passes	Phosphate	52
28	Zinc plated steel	Painted, scratched and salt sprayed	None	61 and 62
29	“ “ “	Not rolled, painted, scratched and salt sprayed	Phosphate	62 and 63
30	“ “ “	Alkali sprayed, not rolled, painted, scratched, and salt sprayed	Phosphate	63
31	“ “ “	Wet rolled, 4 passes, not alkali sprayed, painted, scratched and salt sprayed	Phosphate	64

Exhibits 2A, 3A, 4A, 5A, 6A, 7A, 8A, 9A, 11A, 12A, 13A, 14A, 15A, 16A, 17A, 18A, are photographs at a magnification of 400 of the surfaces of the panels corresponding to the numerals. [redacted] 31, 33, 39

The paramount fact demonstrated by the tests is that the panels, with or without being thoroughly cleaned by scrubbing and washing with the alkali cleaning process previously used to prepare sheets for such coating, but not processed by the moist rolls, would not take good coatings in the time allowed, while those that were processed by the wet rolls either with or without the conventional previous scrubbing or washing with alkali cleaner, took excellent coatings. Something more than mere cleaning appears to be accomplished by the process but it is not known what it is (Appellants' App. 40).

The zinc plated panels (Appellants' physical exhibits 2 to 10, inclusive) contain specimens which were subjected to the phosphate coating solution without any previous cleaning treatment, also some subjected to conventional previous cleaning which consisted of spraying with alkali cleaning solution, and also some subjected to conventional previous cleaning which consisted of spraying with alkali cleaning solution and scrubbing. Specimens having plain steel surfaces (Appellants' Exhibits 11-19, inclusive) were given the same variety of pretreatment, as were specimens having cadmium plated surfaces (Appellants' Exhibits 20-23, inclusive). In all cases where the processing by the moist rolls was not used, and regardless of whether the panel was alkali sprayed, scrubbed, or both or neither, before being subjected to the coating solution, very little coating was obtained. And in all cases where the roll processing of the application was carried out upon the specimens prior to subjecting them to the phosphate coating solution regardless of whether or not the panels had been previously cleaned by alkali spraying or both or neither, excellent, complete and uniform fine grained coatings were obtained. The same thing was demonstrated by the actual operation of the process before the District Court.

The physical evidence above described was given for the first time before the District Court, it had not been presented to the Patent Office.

THE ACTION OF THE PATENT OFFICE.

The Primary Examiner in the Patent Office rejected the application and the claims on the ground that they lacked invention over the prior patent to Saunders 1,872,507 (Appellants' App. 115), and on the ground that Saunders fully met or anticipated Claims 20, 21, and 25. It was said in this rejection (Examiner's statement before the Board of Appeals dated November 2, 1939, page 4, Appellants' App. 116) that:

> "Spraying with water under pressure of a considerable gravity head, as shown by Saunders et al., will mechanically break down the surface tension of the water."

The Primary Examiner rejected claims 22 to 24 and 26 on the ground that:

> "* * * to use rolls to assist uniform wetting in Saunders et al. instead of spraying the water under pressure would amount to an obvious substitution of equivalents and would involve no invention, * * *,"

in view of the prior Allen patent Reissue No. 17,484, the prior patent to Thomas et al. No. 1,360,819, the prior patent to Shonkwiler et al. No. 1,946,766, the prior patent to Spear No. 244,153, and the prior patent to Tanner et al. No. 2,067,214 (Appellants' App. 116, 117).

The Board of Appeals affirmed the Primary Examiner (decision of the Board of Appeals dated April 26, 1940, Appellants' App. 128) holding that, while Claims 20, 21 and 25 were not fully met or anticipated by Saunders, who did not have mechanical means to break down the surface tension of the water, they were not convinced that it might not be assumed that Saunders et al. would apply the water with such force by spraying as to mechanically break up surfoce tension and to accomplish thorough wetting of the surface.

The Board held that Claims 20, 21, and 25 failed to clearly present invention over the disclosure of Saunders on the ground of being equivalent. The Board further held that the remaining Claims 22, 23, 24, and 26 did not involve invention over Saunders supplemented by the other mentioned prior art paents to Allen, Spear, Thomas, et al, or Shonkwiler et al.

As stated before, neither the Primary Examiner nor the Board had before it the physical evidence and testimony which was presented to the District Court.

THE ACTION OF THE DISTRICT COURT.

The District Court found (Fact Finding 3, Appellants' App. 68):

> "3. The only means disclosed in plaintiffs' application, for effecting a complete wetting of the article, is a pair of rolls between which the article is passed. Claims 20, 21 and 25 define this means broadly as 'mechanical means' for breaking down the surface tension of the water. The remaining claims recite rolls. It was not established by the evidence either that the mere breaking down of the surface tension of the water on the surface of the article would result in a complete wetting of the surface, or that the rolls would actually operate to break down the surface tension of the water. Claims 20, 21 and 25 are broader than the alleged invention disclosed in plaintiffs' application and are therefore unpatentable."

The District Court further found (Fact Findings Nos. 9, 10, and 12, Appellants' App. 70):

> "9. The prior patents cited by defendant show that in the art of treating the surfaces of metal sheets it was common to pass the sheet, while wet, between rolls, and certain patents show that it was old to introduce the sheet into a water solution of the treating material immediately after its passage between the rolls. This is exemplified in the Spear patent which discloses the steps of passing the metal sheet while wet between the rubber rollers C^2 and immediately thereafter into the tank D containing a water solution of zinc chloride.

> Similarly in the Shonkwiler et al. patent the metal sheet while wet is passed between wringer rolls 8 and then immediately into an etching bath consisting of a water solution of nitric acid."
>
> "10. The advantage of having the metal sheet thoroughly wet when it enters the aqueous solution of rustproofing material, or aqueous solution of other treating material, is that the aqueous solution will act uniformly and quickly on the whole surface of the sheet. This advantage is inherent in the methods disclosed in the Spear and Shonkwiler et al. patents. The use by plaintiffs of the same wetting procedure and same wetting means to attain the same advantage in a rustproofing method did not require the exercise of invention.
>
> * * * * * * * * *
>
> "12. None of the claims here involved recites anything amounting to an invention over the prior art, and none of these claims is patentable."

STATEMENT OF POINTS.

1. There is no substantial evidence to support the District Court's Fact Finding No. 3.

2. There is no substantial evidence to support the District Court's Fact Finding No. 9.

3. There is no substantial evidence to support the District Court's Fact Finding No. 10.

4. There is no substantial evidence to support the District Court's Fact Finding No. 12.

SUMMARY OF ARGUMENT.

It is urged there is no substantial evidence to support the District Court's decision dismissing the complaint in that there is no substantial evidence to support the District Court's Fact Findings Nos. 3, 9, 10, and 12, which are the only ones that relate to the patentability of the application in issue.

The Patent Office relied primarily upon a certain prior patent to Saunders as anticipating some of the claims requested and when supplemented by additional prior patents as negativing patentable invention over the prior art in the claims requested. The applicability of this prior Saunders patent was disproved by evidence taken before the District Court, which was not before the Patent Office. The District Court in its decision dismissing the complaint has not relied upon this prior reference to Saunders and consequently has not concurred with the Patent Office in its specific reasons for denying patentability to the claims requested.

In denying patentability to Claims 20, 21, and 25, the District Court in Fact Finding No. 3 has relied upon an interpretation of certain terminology which is wholly unsupported by and contrary to the meaning given to that terminology by the specification. The finding violates the definite and established rule of construction that the specification of a patent is in the first instance the dictionary by which is ascertained the meaning of terminology employed, even though that terminology be used in the patent and claims in a sense different from the conventional usage.

In Fact Finding No. 9 the District Court has denied patentability relying upon prior patents which really are not analogous to the invention in issue and which clearly do not disclose or suggest the invention. The District Court application of these prior references is without rational basis or any substantial support in the evidence.

In Fact Finding No. 10, the District Court has relied upon an assumption which is not only unsupported by the evidence but is contrary to the only evidence in the case relating to the point.

Fact Finding No. 12 is purely a conclusion based upon the previous findings mentioned which are without any substantial evidence to support them.

ARGUMENT.

In this case the holdings of the Patent Office and the District Court do not concur in the specific grounds for denial of the patent, they concur only in result. Thus, the presumptive correctness of the Patent Office decision is weakened if not destroyed, and any presumptive correctness of the District Court decision is in reality without support of the Patent Office decision.

Applicability of Saunders Reference Disproved.

The Patent Office relied primarily upon the prior patent to Saunders No. 1,872,507 (Appellants' App. 127) as anticipating invention or negativing patentable novelty in applicants' process. In Saunders a fabricated steel automobile body is treated with a rustproofing solution of the same general chemical character as that used in the invention in issue. The automobile body is cleaned prior to the application of the rustproofing solution by having an alkali cleaning solution sprayed upon it. The pressure to produce the spray is provided by the gravity head developed in the cleaning solution tank which is positioned above the automobile body. The cleaning solution in this tank runs by gravity down the conduits to the spray nozzle where it emerges and impinges against the body, drops from the body to a collecting tank beneath, and is pumped back to the overhead tank for reuse. The Primary Examiner of the Patent Office held that Claims 20, 21, and 25 were fully met by this Saunders disclosure, his opinion being:

> "Spraying with water under pressure of a considerable gravity head, as shown by Saunders et al., will mechanically break down the surface tension of the water."

He also held that Claims 22 to 24 and 26 were lacking in invention because:

> "* * * to use rolls to assist uniform wetting in Saunders et al. instead of spraying the water under pressure would amount to an obvious substitution of equivalents and would involve no invention, particularly in view of Allen showing such use of rolls."

He also rejected Claims 22 to 24 and 26 as not patentable over Saunders et al. in view of any of Thomas et al., Shonkwiler et al., or Spear prior patents, reasoning that as Saunders reference sets out the combination of a cleaning step preceding a *Parkerizing step, there can be no invention in providing a pair of moist rolls to perform the cleaning function, such as 9, 10 of Thomas et al., 6, 8 of Shonkwiler et al., or C′, C of Spear.

It is apparent from this that the main reliance of the Primary Examiner of the Patent Office in rejecting the claims as unpatentable was upon the patent to Saunders. The other patents mentioned merely supplemented that Saunders disclosure. We will point out later where the applicability of the Saunders reference was completely destroyed by the evidence produced before th District Court.

The Board of Appeals affirmed the Primary Examiner and also relied upon Saunders as the main reference, stating:

> "We must, therefore, agree with the Examiner's conclusions that Claims 20, 21, and 25 fail to clearly present invention over the disclosure of Saunders et al., on the ground of being equivalent."

In considering Claims 22, 23, 24 and 26, which specifically call for the use of rolls and for squeezing the sheet between the rolls in the presence of water, the Board stated:

> "In fact, the term 'squeezing' is not noted in the specification. In view of this seemingly non-critical nature of squeezing in distinction to rubbing, we must agree with the Examiner's conclusion that invention is not involved in the claims of this group over Saunders et al. supplemented by Allen, Spear, Thomas et al., or Shonkwiler et al. * * * In view of the record, we are unable to find any particular critical effect or new result following the application of a true squeezing operation, if applicants are considered warranted in such limitation over the action disclosed by Spear or Shonkwiler et al. No mechanical difficulty or we believe any new or unobvious result is thought to apply in merely substituting or adding rubber or rolling effect for or to the water jets of Saunders et al."

*** Parkerizing is a trade name for one process of phosphate coating.**

In the District Court, the applicant Thompson testified that he was familiar with the Saunders system, had operated it and that it was wholly inadequate to produce any of the results produced by the invention in issue (Appellants' App. 23-24).

Physical Exhibits 5, 7, 14, 16, 22, 25, 27 were cleaned by spraying in the general manner of Saunders prior to being submitted to the rustproofing solution and demonstrate that this spraying was not equivalent to the use of the rolls as demonstrated by physical Exhibits 6, 8, 9, 15, 17, 18, 25, 27 (Appellants' App. 26-29, 30, 50-52).

Physical Exhibit 14 in particular was treated like Saunders by spraying before being subjected to the rustproofing solution and it would not take a successful coating. Physical Exhibit 15, on the other hand, was subjected to the rolling operation before being subjected to the rustproofing solution and a very good coating was produced. The difference is clearly apparent (Appellants' App. 29). All of this was also demonstrated by actual operation of the process before the District Court where physical Exhibits 24 to 27, inclusive were processed (Appellants' App. 47-52).

It is clear that this evidence proved conclusively that Saunders did not disclose the invention in issue or its equivalent as held by the Primary Examiner and the Board of Appeals.

As a matter of fact, the District Court and the Defendant ceased to rely upon Saunders as the prime reference, it is not mentioned in the District Court's findings as anticipatory of or equivalent to the invention in issue.

In the absence of Saunders as used and relied upon by the Patent Office, there is no rational basis for the decision of the District Court.

District Court's Fact Finding No. 3 Unsupported.

The District Court held in Fact Finding 3 that the only means disclosed in Appellants' application for effecting a complete wetting of the article is a pair of rolls between which the article is passed, that Claims 20, 21, and 25 define the means of wetting broadly as "mechanical means" for breaking down of the surface tension of the water, that it was not established by the evidence either that the mere breaking down of the surface tension of the water on the surface of the article would result in a complete wetting of the surface, or that the rolls would actually operate to break down the surface tension of the water. In consequence, it said that Claims 20, 21, and 25 were broader than the alleged invention disclosed in the application and therefore unpatentable.

It is true that the only means specifically disclosed in the application for breaking down the surface tension of the water upon the surface of the article are the rolls. However, equivalent effect could be obtained by means which would exert a pressure equivalent and similar to that of the rolls and therefore the term "mechanical means" is justified to include the rolls and equivalent means for accomplishing the same result.

That means other than rolls may be used to break down the surface tension of the water in the manner described is clear from the testimony of the applicant Thompson (Appellants' App. 39-40):

> "X-Q. 121. Would you say that the squeezing of it is necessary by some such means as rolls or other means exerting a squeezing effect?
>
> "A. So far as we know, that seems to be the case. There must be some positive pressure exerted upon the sheet while it is moist in order to get this result.
>
> * * * * * * *
>
> "X-Q. 123. Certain of the claims that you have made in your application do not recite the squeezing action or passage of the sheet between rolls with the squeezing action? Would you say that those claims define invention? I have reference to claims 20, 21, and 25.
>
> * * * * * * *
>
> "A. These claims are talking about reducing the surface tension of the water applied to the sheet prior to the coating operation.

> Now, we don't know exactly just what is the explanation of why we get the results that we do. We do know that when we pass the sheet between rolls and the sheet is in a moist condition, we do get the results that we say we get.
>
> The pressure of the rolls or whatever means is used is probably sufficient to squeeze water down into the little imperfections, cracks, and crevices in the surface of that metal, so that a thin film of water is pushed down into these holes and spread over the entire surface of the sheet uniformly.
>
> That seems to be an essential thing to the success of our invention. If the means which are being used to apply pressure in the presence of moisture are not sufficient to get the moisture down into these crevices and microscopic holes, apparently we do not get what we want."

As used in the patent application in suit, breaking down this surface tension of the water very obviously and clearly means the pressing of the water against the surface of the sheet by a positive pressure. This is clear from the specification of the application, page 2, lines 17-20 (Appellants' App. 82):

> "Hand wheels 19 control an adjusting mechanism whereby driven roller 16 may be raised or lowered to permit the passage of various sizes of work 20 between the rollers, and also regulate the pressure of the rollers on the work,"

page 4, lines 18-20: (Appellants' App. 84)

> "Handwheels 19 are then turned to raise or lower driven roller 16 sufficiently to accommodate the article to be processed, and to regulate the pressure thereon.",

page 4, last paragraph: (Appellants' App. 84)

> "The articles to be processed, as shown in Fig. 2 of the drawings, being sheet metal sheets, are fed between the rollers 16 and 17 and inasmuch as the rollers are wet, and their peripheral surfaces sufficiently close, both the top and bottom surface of the article being

> processed is subjected to a scrubbing and wiping action, which thoroughly removes all foreign matter such as scale or surface corrosion and at the same time breaks the surface tension sufficiently to enable the processing solution to quickly convert the surface of the article being treated from a metallic one to a non-metallic one.''

The language used (claim 21 is typical), ''the breaking down of the surface tension of the water * * * by mechanical means'' connotes the use of pressure and the additional words used, ''to effect the complete wetting of the sheet'' state the effect of squeezing the water against the surface of the sheet. The Patent Office did not criticize the language mentioned, it clearly understood it to be used in the sense stated. Regardless of the conventional scientific meaning of the words ''break surface tension'', the specification constitutes the dictionary in a particular case and must be followed when its meaning is clear as it is in this case.

> *Jones et al.* v. *Sykes Metal Lath & Roofing Co.*, 254 Fed. 91, 96 (C. C. A. 6);
> *Cincinnati Rubber Mfg. Co.* v. *Stowe-Woodward, Inc.*, 111 F. (2d) 239, 242 (C. C. A. 6);
> *Rajah Auto Supply Co.* v. *Belvidere Screw & Machine Co.*, 275 F. 761, 763 (C. C. A. 7);
> *Victory Belt Co.* v. *Marshall Field & Co.*, 300 F. 67, 71 (C. C. A. 7).

The District Court did not comply with this rule in its holding that it was not established by the evidence either that the mere breaking down of the surface tension of the water on the surface of the article would result in complete wetting of the surface, or that the rolls would actually operate to break down the surface tension of the water. It was conclusively proved as above pointed out that surface tension was broken and complete wetting obtained within the meaning assigned by the specification to the language used.

The Court's error lies in the assumption that the applicants claim that the mere breaking of the surface tension of the water is sufficient for the purpose of the invention. They do not claim that, but only that the breaking of the surface tension of the water on the surface of the sheet by squeezing the water against the surface of the sheet by the rollers or by other equivalent mechanical means and then subjecting the sheet while wet to the aqueous rustproofing solution will bring the new result.

District Court's Fact Finding No. 9 Unsupported.

The District Court Fact Finding No. 9 is true enough except that it relates to prior art that is not properly analogous to the invention in issue. The Spear patent No. 244,153 relates to a process and apparatus for galvanizing metal sheets. This is a very different process than the invention in issue. Galvanizing is applying a metallic zinc surface to another metal sheet by means of immersion of the sheet in a molten zinc bath. The invention in issue relates to the provision of a non-metallic, as distinguished from a metallic, coating on the surface of the metal sheet by means of the chemical reaction which occurs between an aqueous solution of rustproofing compound and the surface of the sheet. In the Spear patent, the galvanized surface is not applied by any chemical reaction with the surface of the sheet (Appellants' App. 17-18, Q. 23-28). There, the sheet is cleaned and then dipped in a bath of molten zinc which is subsequently allowed to cool and harden on the surface of the sheet.

In the invention in issue, the material that forms the non-metallic coating and becomes integral with the surface of the sheet is composed partly of metal that has first to be dissolved from the surface of the sheet by chemical reaction and then combined with other elements in the solution and at the same time deposited upon the surface of the sheet (Appellants' App. 18, Q. 29). Obviously, the characters of the two coatings are entirely different in addition to being formed and applied by entirely different means. It is equally obvious that the conditions critical to the provision of these two different coatings are likewise radically different. In the case of the prior art, the coating material is reduced to a molten condition. No chemical changes or reactions in the sense of necessary combinations with other elements are involved. The character of the coated material is never changed. It remains metallic zinc throughout. Its connection to the surface of the sheet to which it is applied is by adhesion and fusion and not by a chemical combination with that surface as is the case with the invention in issue. It is quite true that in the Spear patent referred to, the sheet, prior to its immersion in the molten zinc bath, is pretreated by placing it in a tank of sulphuric acid in which it is pickled. "Pickling" means dissolving of a part of the surface of the sheet to remove mill scale, etc. Its purpose is to get a clean metallic surface exposed. Next, the sheet passes through a tank containing lime water which neutralizes the sulphuric acid previously used to pickle and prevents further corrosion of the iron. The sheet next enters a tank containing water and there it is scrubbed by brushes and it passes from the water tank between gum rolls which remove the water from the sheet. The only purpose of these rollers is removal of water. There is no necessity disclosed for wetting the sheet or breaking the surface tension of the water or anything of the sort. All Spear wishes to do is to get the water off, undoubtedly so that it will not dilute the zinc chloride or muriatic acid solution in the next tank. This zinc chloride or muriatic acid is used as a further pickle or flux. Upon leaving the zinc chloride or muriatic acid tank, the sheets again pass between rollers into an oven where they are dried under heat, after which they are immersed in molten zinc.

It is essential to the invention in issue, on the contrary, that the sheets be not dried before entering the rustproofing solution and undergoing the chemical reaction by which the coating is formed. The two main steps of the invention in issue are to properly pressure wet the sheets and then pass them while so wetted into the chemical solution with which they react to create the coating. In the Spear patent, the sheets are dried in the oven before they are immersed in the molten zinc bath.

The Thomas et al. patent No. 1,360,819 also cited is for all practical purposes the same as the Spear patent, except that no drying oven is used. It discloses apparatus and a process for tin or terne plating steel sheets. The sheets emerge either with a coating of metallic tin or with a metallic terne coating of lead and tin alloy. Like Spear, the sheets are first pickled in acid to provide a clean metallic surface, they are then washed in water and upon passing out of the water bath are taken between feed rolls which carry the sheets to the tank containing the molten tin or terne metal. The rolls in this case are for the purpose of feeding the sheets through the machine. Nothing whatever is said of removing water from the sheets by means of the rolls or of breaking the surface tension of the water on the sheets or of wetting the sheets by means of the rolls. The whole object of Thomas was to provide a machine for cleaning and tin or terne plating sheets that would eliminate the necessity for manual handling during the process. The rolls are not described as playing any part whatever in conditioning the sheet for receiving the tin or terne metallic coating, and certainly they perform no function of conditioning the surface of the sheet to take part in a subsequent chemical reaction by which the ultimate coating is formed.

The Shonkwiler patent No. 1,946,766 discloses apparatus and process for etching the surface of steel sheets to which metallic zinc or metallic terne metal or paint or lacquer is subsequently applied. Shonkwiler etches the surface of the sheet to provide a rough metallic surface which will provide minute points and crevices to which paint or lacquer or subsequent zinc or terne coats can cling. Etching comprises eating or dissolving part of the surface of the sheet by acid.

After the sheet is hot rolled, it is pickled in a pickling acid such as sulphuric acid to remove the mill scale. After this, it is cold rolled and then passed through water jets and rotating scrub brushes to remove the oil applied when rolling, and then through rubber wringer rolls which are designed to remove the water from the sheet before it passes into the bath of nitric acid which etches the surface, leaving it relatively rough. The reason for removing the water from the surface of the sheet before it enters the nitric acid etching bath is obviously to prevent the water from diluting the etching acid bath. No other function or purpose is assigned to the rolls by the disclosure. There is no necessity for seeing that the sheet is properly wet before it enters the etching bath. The whole purpose of the rolls is to remove water. No function of breaking the surface tension of the water on the surface of the sheet is assigned to the rolls.

It is clear that the apparatus and process of Shonkwiler are for a purpose entirely different from that of the invention in issue. Shonkwiler provides no coating upon the surface of the sheet either by chemical reaction or otherwise, he is interested in and accomplishes only a roughing of the surface of the sheet by etching.

In the invention in issue, an essential step is to provide an additional coating on the surface and that by a chemical reaction between the sheets and the solution in which the coating material is simultaneously formed and integrally deposited on the surface of the sheet. There is no relation between the two processes except that both treat the surfaces of steel sheets, but in an entirely different manner and with a different result. Shonkwiler's process is to hot roll, pickle, cold roll, wash, etch and anneal. Appellants' process is to pressure wet and then subject to an aqueous rustproofing soution with which the pressure wet sheet reacts chemically to create an integral coating.

Each claim in issue here is for a process comprising two main steps. The first is the breaking down of the surface tension of water on the surface of the sheet by rolls or other equivalent mechanical means to thoroughly wet that sheet, and the second is immediately submitting it while so wetted to the aqueous rustproofing solution where the integral non-metallic coating is formed by a chemical reaction. None of the prior patents, Spear, Thomas, or Shonkwiler, disclose or even remotely suggest this process. Feed rolls and wringer rolls, which they disclose, are not used to apply water, they are used for removing water or for advancing the sheet in these prior patents. The fact that they might be used to apply water is of no consequence because there is no significance in any such application of water in those patents. Consequently, the use of the rolls as disclosed by Spear, Thomas, and Shonkwiler would not suggest the use of the rolls as in the present invention for applying water in the particular fashion that is essential to the subsequent step of the process any more than would the age-old use of rolls in clothes wringers.

District Court's Fact Finding No. 10 Unsupported.

The District Court Fact Finding 10 that "the advantage of having the metal sheet thoroughly wet when it enters the aqueous solution of rustproofing material, or aqueous solution of other treating material, is that the aqueous solution will act uniformly and quickly on the whole surface of the sheet" is not supported by any evidence. There is no evidence at all on this point except the testimony of the applicant Thompson which is contrary (Appellants' App. 40, 41):

> "X-Q. 124. Is it not a fact well known to chemists that if you wish to have some solution act on some surface, it is advantageous to wet that surface first with water, in order that the solution will act on the surface uniformly and instantaneously, so to speak, all over it?
>
> "A. Well, ordinarily the chemist is working with aqueous solutions; and he cannot very well help but get whatever he is working with wet if he sticks it into the solution.
>
> "X-Q. 125. That is not what I meant to ask you. I meant to ask, Is it not advantageous to first wet the object with water before applying the chemical solution to it, in order that the chemical solution will react uniformly and instantaneously over the whole surface?

> "A. I understand your question, but I was just trying to think of a case where that would be true. But I can't think of any.
>
> * * * * * * * * *
>
> "X-Q. 128. Then you do not know that it is a fact that it is the practice to wet things with water first befor you apply a chemical solution to them where you expect to get a treatment of the surface?
>
> "A. Chemistry is a big field. What kind of material are you talking about? I can't think of a case that would comply with what you are thinking.
>
> "X-Q. 129. In so far as you know, it is not the practice to wet the object first?
>
> "A. It may be; but if it is the practice, I don't know it. I am not familiar with it."

The Fact Finding 10 quoted above appears to be purely an assumption on the part of the Patent Office solicitor who proposed the findings and of the Court that adopted the finding and it is contrary to the only evidence on the point. It is a necessary consequence that the additional finding under the same number:

> "This advantage is inherent in the methods disclosed in the Spear and Shonkweiler et al. patents",

is likewise without substantial support in the evidence. Also, the further finding:

> "The use by Plaintiffs of the same wetting procedure and same wetting means to attain the same advantage in a rustproofing method did not require the exercise of invention",

constitutes a conclusion based upon previous Fact Findings that are without evidential support.

District Court's Fact Finding No. 12.

Fact Finding No. 12, which is clearly a conclusion based upon preceding conclusions expressed in unsupported Findings Nos. 3, 9, and 10, is also without any substantial evidence to support it.

Prior Art Not Specifically Applied in District Court's Findings.

The Tanner et al. patent No. 2,067,214 discloses the use of phosphate coating solution but not in any process like that of the invention in issue, it is directed to the use of chromic acid rinse after certain types of phosphate coatings are formed and is pertinent only to claim 26 which includes as an added step the chromic acid rinse.

The prior patent to Allen discloses a rustproofing process which uses a rustproofing solution like that of the present invention but in which the surface of the sheet to be coated is constantly rubbed while the chemical reaction which forms the coating is proceeding. This is entirely different from the process of the invention in issue where the surface of the sheet is conditioned by being wet in the particular manner described prior to being subjected to the rustproofing solution and the attendant chemical reaction which forms the coating. Agitation or disturbance of the chemical reaction such as is carried out in Allen is an entirely different process than specially pretreating a surface and then subsequently subjecting it to an undisturbed chemical reaction.

Present Invention is Patentable.

The present case is substantially the same as many in which this Court has authorized the Commissioner to grant patents.

Kelly et al. v. *Coe,* 99 F. (2d) 435 was a suit brought under R. S. 4915 to authorize the Commissioner to grant a patent on a method of dust control. Among other things, the Court stated:

> The fact that Kelley's method may seem simple in its operation does not disprove invention. The difference between it and the prior art may not be great in a physical sense, but slight as it may seem to be, it was sufficient to achieve success where success had never before been achieved. It was not merely one step in a development process, but was the one step from failure to success."

In *Carbide & Carbon Chemical Corp. et al.* v. *Coe,* 102 F. (2d) 236, 241, the Court stated:

> "And if obviousness is doubtful, the doubt may be resolved by the satisfaction of a need which the art, long knowing, has failed to satisfy."

In *Lucke et al.* v. *Coe,* 69 F. (2d) 379, 383, this Court stated among other things:

> "It is comparatively easy, now that the Lucke device is in evidence to take this and that from the references and achieve a nunc pro tunc solution of the problems confronting Lucke when he made his invention. We rule, therefore, that the claims denied by the Patent Office should be allowed."

The fact that the machinery disclosed and used by applicants in their process resembles machinery known in the prior art does not negative patentability. This point was decided by the Supreme Court of the United States in *Cochrane et al.* v. *Deener, et al.,* 94 U. S. 780, 787, 788, 24 L. Ed. 139, where the Court stated:

> "* * * The machinery pointed out as suitable to perform the process may or may not be new or patentable; whilst the process itself may be altogether new, and produce an entirely new result. The process requires that certain things should be done with certain substances, and in a certain order; but the tools to be used in doing this may be of secondary consequence."

It is respectfully submitted that, the District Court Decision lacking support of any substantial evidence, the judgment should be reversed and the Commissioner of Patents authorized to grant the letters patent applied for.

ARTHUR W. DICKEY,
Counsel for Appellants.

STEPHEN W. BLORE,
Of Counsel.

APPENDIX

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APPENDIX

1 Endorsed: Filed July 20 1940 Charles E. Stewart, Clerk.

DISTRICT COURT OF THE UNITED STATES

For the District of Columbia

Civil Action No. 7741.

John S. Thompson and Harold J. McVey,

2177 East Milwaukee Avenue, Detroit, Michigan.

Plaintiffs,

v.

Conway P. Coe, Commissioner of Patents, *Defendant.*

Bill of Complaint for Letters Patent

1. This action arises under Section 4915, Revised Statutes (Title 35, Section 63, U. S. C.), as amended by acts of March 2, 1927, and March 2, 1929.

2. Plaintiffs, John S. Thompson and Harold J. McVey, are citizens of the United States, residents of the City of Detroit, County of Wayne, and State of Michigan.

3. The Defendant, Conway P. Coe, Commissioner of Patents of the United States, is a citizen of the United States and has his official residence as such Commissioner in the District of Columbia, and is named as Defendant in this Complaint in his official capacity as Commissioner of Patents of the United States.

2 4. That Plaintiffs, John S. Thompson and Harold J. McVey, having invented certain new and useful improvements in Method of Cleaning Metal, duly filed in the United States Patent Office on April 26, 1937, an application for Letters Patent, Serial No. 138,868, said applica-

tion complying in all respects with the requirements of law in such case made and provided.

5. That said application for United States Letters Patent was duly prosecuted in the United States Patent Office, and the following claims, which were presented therein, were finally rejected by the Primary Examiner, erroneously, as Plaintiffs believe:

20. In the rust-proofing of metallic objects by subjecting the same to the action of an aqueous solution of rust-proofing material, the step of applying water to the object prior to immersion in the rust-proofing solution and breaking down the surface tension of the water by mechanical means to effect a complete wetting of the surface of the object immediately prior to the rust-proofing step whereby said solution will immediately attack the entire surface of the object with substantially equal intensity.

21. In the rust-proofing of metallic objects, the step of applying water to the surface of said object, breaking down the surface tension of water in contact with the surface of the object by mechanically operated means whereby to effect the complete wetting of the surface of the object, and subjecting said object while its surface is completely wetted by said water to the action of an aqueous solution of rust-proofing compound.

22. In the rust-proofing of metallic objects by subjecting them to the action of an aqueous solution of rust-proofing compound, and the employment of rolls in the preparation of the object for the rust-proofing step, the step of subjecting said object to a squeezing operation between said
3 rolls in the presence of water whereby said rolls
break down the surface tension of said water and completely wet the surface of the same for reception of the rust-proofing solution, and then immediately subjecting said wetted surface to said aqueous solution of rust-proofing compound.

23. The use of rolls in the rust-proofing of metallic objects by the action of an aqueous solution of rustproofing compound, the step of subjecting the object to a squeezing action between said rolls in the presence of water to effect a complete wetting of the surface of the object preliminery to the action of said rust-proofing compound thereon, and then subjecting said object to the action of said aqueous solution of rust-proofing compound while said surface remains completely wetted.

24. The use of rolls in the rust-proofing a metallic article by the action of an aqueous solution of rust-proofing compound, the steps of subjecting the article to a squeezing action between said rolls in the presence of water to effect a complete wetting of the surface of the article and immediately subjecting said wetted surface to the action of said solution.

25. In the rust-proofing of objects by subjecting the same to the action of an aqueous corrosion retarding fluid compound, the step preliminary to the subjecting of said object to said fluid compound comprising applying at least the water element of said compound to the surface of said object and effecting a wetting of said surface by said element by mechanical means whereby in the subsequent action of said compound on said object, said compound will immediately and uniformly affect the entire surface of said object.

26. In the rust-proofing of metallic objects by subjecting them to the action of an aqueous solution of rust-proofing compound and the employment of rolls in the preparation of the article for the rust-proofing step, the step of subjecting said article to a squeezing operation between said rolls in the presence of water whereby said rolls break down the surface tension of said water and completely wet the surface of the same, immediately subjecting the surface of said article to the effects of the rust-proofing solution to convert the surface of said article from one of metal to one of non-

metal, and thereafter subjecting the metal article to a final rinse in a solution containing one of the group of chromic acid, phosphoric acid, oxalic acid and mixtures thereof.

4 6. That Plaintiffs, in compliance with law, duly appealed from said final rejection to the Board of Appeals of the United States Patent Office, and said Board of Appeals, after hearing said appeal, erroneously, as Plaintiffs believe, in a decision dated April 26, 1940, affirmed the final rejection made by the Primary Examiner and refused a patent to the Plaintiffs upon said finally rejected claims, all as will appear in the duly authenticated copy of said application and all proceedings in connection therewith in the Patent Office, to be presented at the trial.

7. That no appeal has been taken from said decision of the Board of Appeals to the United States Court of Customs and Patent Appeals, and no such appeal is pending or has been decided.

Wherefore, the Plaintiffs bring this suit and pray for a decree adjudicating that they are entitled to receive a patent of the United States for the invention defined in said claims, Nos. 20 to 26, inclusive, of said application, and authorizing and directing the Commissioner of Patents to issue to Plaintiffs a patent on said claims and each of them.

John S. Thompson and Harold J. McVey,
By John A. Blair
Harness, Dickey & Pierce,
Attorneys for Plaintiffs,
7-141 General Motors Bldg.,
Detroit, Michigan.

Associate Attorneys:
Richard P. Schulze,
Shoreham Building,
Washington, D. C.

5 CITY OF WASHINGTON
District of Columbia, ss:

Richard P. Schulze, being duly sworn, doth depose and say: That he is associate attorney for plaintiffs in the foregoing cause;

And that he verily believes the facts stated in the attached pleading to be true.

RICHARD P. SCHULZE.

Subscribed and sworn to before me this 23rd day of July, 1940.

EDITH G. REEL,
Notary Public, D. C.

It is hereby certified that I have this day of July, 1940, sent by registered mail copies of the foregoing Bill of Complaint for Letters Patent to—

The Attorney General of the United States,
Department of Justice,
Washington, D. C.

and

United States Attorney,
District Court of the United States for the District of Columbia, Washington, D. C.

RICHARD P. SCHULZE,
Associate Attorney for Plaintiffs.

6 IN THE DISTRICT COURT OF THE UNITED STATES
FOR THE DISTRICT OF COLUMBIA.

Civil Action No. 7741.

JOHN G. THOMPSON and HAROLD G. MCVEY, *Plaintiffs,*

v.

CONWAY P. COE, Commissioner of Patents, *Defendant.*

W. W. Cochran,
Solicitor, U. S. Patent Office,
Attorney for Defendant.

Answer to the Complaint.

To the Honorable the Justices of the District Court of the United States for the District of Columbia.

1, 2, 3. Defendant admits the allegations of paragraphs 1, 2 and 3.

4. He admits that plaintiffs John G. Thompson and Harold G. McVey, claiming to have invented certain alleged new and useful improvements in Method of Cleaning Metal, filed an application for patent thereon in the United States Patent Office on April 26, 1937, to which application Serial No. 138,868 was given. He admits that said application was duly filed and was in compliance with the requirements of law.

5. He admits that said application was duly prosecuted and that claims 20 to 26, inclusive, thereof, which are
6½ as set out in paragraph 5, were finally rejected by the primary examiner. He denies that the rejection of said claims was erroneous.

6. He admits that plaintiffs duly appealed from and final rejection to the Board of Appeals of the Patent Office and that said Board, in a decision rendered on April 26, 1940, affirmed the rejection of said claims and thereby refused plaintiffs a patent including any of said claims. He denies

that the refusal of said claims was erroneous or that plaintiffs are lawfully entitled to a patent containing any of the said claims since it is deemed that the said claims are unpatentable in view of the following prior patents and for the reasons given in the statement of the examiner in answer to the appeal and the decision of the Board of Appeals, copies of which will be furnished at the trial:

Spear	244,153,	July 12, 1881,
Thomas, et al.,	1,360,819,	Nov. 30, 1920,
Saunders et al.,	1,872,507,	Aug. 16, 1932,
Shonkwiler et al.,	1,946,766,	Feb. 13, 1934,
Tanner et al.,	2,067,214,	Jan. 12, 1937,
Allen, Reissue,	17,484,	Nov. 12, 1929.

Profert of copies of these patents is hereby made.

7. He admits the allegations of paragraph 7.

W. W. Cochran,
Solicitor of the Patent Office,
Attorney for Defendant.

Aug. 14, 1940.

I hereby certify that a copy of this Answer was mailed to the attorney for plaintiffs on August 14, 1940.

W. W. Cochran,
Attorney for Defendant.

* * * * * * * * * *

8 Endorsed: Filed May 28, 1942. Charles E. Stewart, Clerk.

Transcript of the Shorthand Report of the Proceedings, Etc.

In the District Court of the United States for the District of Columbia

Civil Action No. 7741

JOHN S. THOMPSON, and HAROLD J. McVEY,
Plaintiffs,

v.

CONWAY P. COE, Commissioner of Patents,
Defendant.

Washington, D. C.
Wednesday, January 7, 1942.

Pursuant to notice theretofore given to all known interested parties, and designation theretofore made by the Assignment Commissioner, the above-entitled cause came on for hearing and trial at 11:30 o'clock a. m., Wednesday, January 7, 1942, in the District Court of the United States for the District of Columbia, in the court house in the City of Washington,

BEFORE:

Honorable Matthew F. McGuire, Associate Justice of the District Court of the United States for the District of Columbia, there being

PRESENT:

Arthur W. Dickey, Esquire, and Richard P. Schulze, Esquire, for the plaintiffs;

W. W. Cochran, Esquire, for the defendant.

Thereupon the following proceedings and transactions were had and testimony was taken:

9 *Proceedings, Transactions and Testimony*

Mr. Schulze: If your Honor please, for the purposes of this case, I move the admission of Mr. Arthur W. Dickey of Detroit, a member of the Michigan Bar.

The Court: He may be admitted.

Mr. Dickey: If the Court please, I wish to hand up for the Court's information a copy of the patent application and application drawing, and with it such actions of the Patent Office as bear upon the claims which are in issue in this particular suit. I would like to have it marked as Plaintiff's Exhibit 1 and considered as in evidence.

The Court: Have you any objection, Mr. Cochran?

Mr. Cochran: It is my understanding that Mr. Dickey is offering this as a temporary exhibit, to be replaced by duly certified copies being made by the Patent Office.

Mr. Dickey: That is true.

Mr. Cochran: With that understanding I have no objection.

(The file of documents referred to was received in evidence and marked "Plaintiff's Exhibit 1.")

Mr. Dickey: This action, if the Court please, is brought under Section 4915, Revised Statutes, which is Section 63 of Title 35, U. S. Code, which provides that one who is refused a patent by the Patent Office may bring his action in a court of equity against the commissioner to authorize the commissioner to issue a patent upon the application which is under consideration.

The patent application which we have under consideration in this case relates to the art of rust proofing metal surfaces, and to the particular branch of that art or
10 part of that art which consists in providing a coating
upon the surface of sheets, such as steel, or metal articles, such as steel articles, or zinc-covered steel, which will retard or prevent rusting or corroding, and which will also form a bond or medium by which paint may be bound to that metal surface.

It provides a rather rough surface. It seems quite smooth and it has the faculty or quality of being something that paint will stick to very well. It is used very widely for that purpose.

In the application under consideration here the coating is formed of a phosphate of a metal, such as a zinc phosphate, or it might be an iron phosphate or it might be a manganese phosphate. That forms a non-metallic compound. It is not the pure metal itself. It is a compound of the metal and phosphoric acid. That compound is formed right on the surface of the steel sheet.

That coating is formed by a chemical reaction which occurs at the surface of the sheet and which involves a reaction between the metal sheet itself and the solution which contains the phosphate.

Now, that solution is made up of zinc phosphate, and is diluted with water. It is an aqueous solution of acid and zinc phosphate.

In order to form a coating on the metal sheet, the sheet is immersed or may be immersed in the solution. The solution is heated and the sheet immersed in it. And then a chemical reaction occurs at the surface of that sheet, in
which this phosphate coating is formed on the
11 surface of the sheet, and is integral with the surface
of the sheet.

I will show you some of those sheets in a few minutes.

Now, the application also mentions the formation of coatings by means of the use of oxalic acid instead of phosphoric acid, and also speaks of oxide coatings. They are all of the same general nature, in that they involve a chemical reaction at the surface of the sheet and provide a coating on the sheet.

These coatings that are formed are insoluble in water and are very rust-resistant, and, as I stated, they do form an excellent bond for paint.

The art of rust proofing by means of phosphate coatings is an old one. It has been known for many years and been practiced for many years. And various improvements have been made in the way of applying the coating, in forming the sheet, the painting of the sheets, and the treating of them.

In our particular case here the special utility and value and usefulness of this invention lies in providing a way of applying these coatings to the sheets at the rolling mill as the sheets are made up and rolled out. Then they are fabricated.

Heretofore this particular kind of coating had been applied to the fabricated articles. That is, it was applied to articles that had already been formed out of the sheet. After the forming is done, then the article itself is subjected to the coating solution and the coating formed on it, and then thereafter painted.

That had been the general practice up until the advent of this particular discovery or invention involved
12 here. There had been no satisfactory means of providing such a coating upon the sheets at the rolling mill and prior to the fabricating of the sheet. They had found when they attempted to do it that when you took the sheet and coated the sheet and stamped it out or bent it up to form the article which you wished to make from it, the coating would break off and flake off at the bend, and would not provide the rust proofing there, and would provide a different kind of paint coverage at those bends where the sheet had been bent. So that when this invention was made, it provided the first successful means of putting those coatings upon the sheets at the rolling mill prior to the fabrication of the sheet.

I might say that in previous trials and in the previous practice one of the objections and difficulties encountered in addition to the flaking off or crumbling off of the coating when the sheet was bent was that you get a streaky coating, a non-uniform coated surface.

Here are some panels some of which will be introduced later in evidence, which will enable your Honor to see something of what those coatings look like. The top right part has not been coated on this one (indicating). The lower part has been coated.

As I say, another disadvantage or difficulty which they had encountered when they attempted to form these coatings on the sheets at the mill was that you get streaked sur-

faces, surfaces with different and uneven coloring. That had an effect upon the paint, especially light-colored paint. When that was put on, the dark background of the sheet
would show through the paint, giving sort of an un-
13 even color or luster to the paint; and it was necessary
to use more paint to cover that up.

Those are the main disadvantages which have been overcome by the advent of this invention.

The invention was before the Patent Office, of course; and the Primary Examiner rejected the claims on certain references, which will be brought to the attention of the Court. Then it was before the Board of Appeals, which affirmed the Primary Examiner. The error, I think, of those rejections will become apparent as the evidence comes in.

I propose to put on the inventors, and then we will invite the Court to witness an operation of the process, a demonstration of the process, which we have set up to perform in one of the rooms down the corridor, so that you can see exactly how it is done.

Mr. Cochran: May it please the Court, the essence of the alleged invention here, as I see it, is the use of some mechanical means, as set forth in the claims, for breaking up the surface tension of the water which is on these sheets of metal. The plaintiff uses in some cases wringer rolls to do that just before the sheet is placed in the bath where it receives the rust proofing coating.

The position of the Patent Office is that that sort of manipulation on sheets of metal is old and is shown in several of the patents which will be introduced in evidence.

That takes care of most of the claims.

There is one claim which speaks of a particular kind of rinsing solution which is used at the end of the process.
But there is another patent which will be offered in
14 evidence which clearly shows the use of those mate-
rials as rinsing materials.

The general position of the Patent Office is that there is nothing disclosed here except what is shown in the prior patents. We say that rust proofing with the materials which are used here is not a new thing. It is only in this intermediate step that the alleged invention is said to be.

Mr. Dickey: Call Mr. Thompson.

Thereupon John S. Thompson one of the plaintiffs, was called as a witness for and in behalf of the plaintiffs, and being then and there duly sworn by the Clerk of the Court, assumed the witness stand and, upon examination, testified as follows:

Direct-examination by Mr. Dickey:

Q. 1. What is your age, Mr. Thompson? A. Thirty-seven.

Q. 2. What is your residence? A. Detroit, Michigan.

Q. 3. What is your occupation? A. I am a research chemist.

Q. 4. By whom are you employed? A. Parker Rust Proof Company, Detroit.

Q. 5. How long have you been so employed, Mr. Thompson? A. For over twelve years.

Q. 6. Are you the John S. Thompson who is named as applicant and co-inventor in the application for U. S. Patent, Serial No. 138,868, filed April 26, 1937, and
15 in which Harold J. McVey is named as the other inventor? A. Yes, I am.

Q. 7. Will you describe to the Court briefly your invention and how it works? You may use a copy of the application drawing for that purpose. There is a copy of it in the file before the Court. A. This invention makes use of pressure exerted on a sheet of metal in the presence of moisture prior to subjecting the metal to the rust proofing solution.

In a specific illustration of the invention we have used cloth-covered or rubber-covered rolls whose surfaces are wet with water.

The function of the rolls is to uniformly spread over the entire surface of the sheet a thin film of water, and this water is under sufficient pressure to penetrate any crevices or pits or irregularities in the metal surface.

By the Court:

Q. 8. That pressure comes from the rolls, does it? A. Yes.

Any ordinary metal as it is, no matter how smooth it may appear to the naked eye, does have pits and crevices in the surface.

By Mr. Dickey:

Q. 9. Now, referring to figure 2 of the drawing and the application, which shows a vertical section or view of the apparatus, will you start in and explain from the beginning of the apparatus to the end what occurs and how it occurs? A. In figure 2 at the right-hand end of the drawing there
are rolls 16 and 17 indicated. Above those rolls is
16 shown a hand wheel, with which pressure may be
exerted on the top roll, so that a squeezing action is
developed on the sheet which goes between the two rolls. The sheet is indicated as No. 20.

Just to the right of the hand wheel there is shown a pipe from which water is delivered to the roll.

Q. 10. What feeds the sheet into the tank? A. The sheet first goes through these two rolls, which in addition to exerting the pressure in the presence of the moisture, also convey the sheet down toward the processing bath until the sheet comes to rest on the conveyor, which is shown here running between the two cog wheels in the middle of the picture.

The sheet is conveyed through the solution on this conveyor, which consists of a series of steel linked chains.

The tank in which the conveyor is shown is filled with a processing bath, which has been heated; and during the passage of the sheet through this bath it receives a corrosion-retarding and paint-binding coating.

Q. 11. What is the composition of that bath or solution contained in the tank? A. This is an aqueous solution containing phosphates of zinc and iron together with some zinc nitrate.

Q. 12. Then what occurs to the sheet after it has passed through the coating solution? A. After the sheet has received this coating, it is elevated by the conveyor and is caught by another set of rolls at the end of the machine, and is passed between those rolls. The first pair of rolls
serves to squeeze off the excess of the processing
17 solution and to make it flow back into the processing
tank.

Then the sheet continues on between two other rolls and is subjected to a spray of water, which removes any small amount of adhering solution, and which will get rid of any soluble salts that might be left there by the processing bath.

From there on it goes past the next set of rolls and is given a brief rinse with a dilute solution of chromic acid.

Finally the excess of this rinse solution is also removed from the sheet with a pair of rolls, after which the sheet is dried with a blast of air, which is not shown in this diagram, and is then stacked ready for shipment and use.

Q. 13. Now, what is the particular special usefulness of this invention, Mr. Thompson? A. The principal use of the invention is in the treatment of flat sheet metal prior to fabrication, such as is found in these exhibits, just as it is ready to ship or before it is ready to ship by the steel plants who manufacture such sheets.

Q. 14. Where is this process described in the application used, for example? A. That is in operation at the American Rolling Mill Company of Middletown, Ohio.

Q. 15. I mean, where in the manufacture of steel is it used? A. It is used at the steel mill after the usual operations necessary for producing the steel sheet are completed.

Q. 16. What can you say as to any attempts, if any, that have been made prior to the making of this invention to
treat sheets or to rust proof sheets by giving them
18 some sort of coating at the mills or prior to the

fabrication of the sheet? A. The advantage of such a treatment has been recognized and well known for a good many years, and a number of attempts have been made to produce an all-around satisfactory coating on flat sheets. But for some reason or another, up to the time of this invention none of these treatments have proven to be satisfactory.

Q. 17. What were the difficulties encountered or what were the objections to the coating? A. In some instances phosphate coatings have been experimented with. But one of their difficulties was that the coating which was obtained, although it might be uniform over the entire metal surface, was of too coarse a crystalline nature; and these crystals during the forming and fabrication of the sheets into the final article would crumble or crack and become loose from the metal and just fall off. And in the area where this would happen the corrosion resistance of the sheet would be decreased and the paint binding ability of the surface at that point would also be weakened.

Q. 18. Did you have any other difficulties to overcome? A. It has been possible in some cases to produce uniform coatings of finely crystal line nature; but these processes have not amounted to very much because, although the coating was there, it was not of much value because neither the paint adhesion to the surface or the corrosion resistance was good enough to satisfy the trade.

Q. 19. You are speaking now of what sort of coating? A. Well, there are the oxide types of coatings, which have been experimented with.

19 Q. 20. And they have used galvanized coatings? A. Yes. Galvanized metal has been available for years, and at the time this invention was made; and it has very good corrosion resistance in the bare condition.

But zinc surfaces are notoriously bad to paint over. The paint adheres very poorly, and in a short time usually becomes brittle and will fall off the surface in large flakes.

So, although this sheet had one very admirable property, it was completely lacking in another, which was very essential.

Q. 21. And the property that it lacked was what? A. It was completely lacking in good paint adhesion.

By the Court:

Q. 22. Let me ask you a question. Do I understand you to say that the essence of the matter involved here is not the invention of a chemical process, but merely the invention of a mechanical means which lends further perfection to the end result obtained in the deposition of the phosphate?

Mr. Dickey: I think that that is a fair statement.

The Court: In other words, the applicant claims invention under the mechanical aspect of the matter and not any chemical process?

Mr. Dickey: That is right. The chemical process itself is an old one. What we have here is a process for preparing the metal to take that chemical process later.

The Court: That is, in the mechanical means?

Mr. Dickey: That is the mechanical means shown and described in the application. The chemical effect that it has is incidental.

The Court: I understood that, but in my mind I wanted to get it straight.

By Mr. Dickey:

Q. 23. Now, what is the nature of the galvanized coating as compared with the type of coating that is described in your application? A. The galvanized sheet is produced by running a steel sheet through a molten bath of zinc. When the sheet emerges from the zinc bath, the metallic zinc solidifies upon the surface. So that the galvanized sheet is simply a steel sheet with a layer of metallic zinc on its surface.

Q. 24. Does that involve the deposit of metallic zinc on its surface? Does that involve any chemical reaction between the surface of the metal sheet and the zinc solution or galvanizing solution? A. No. It does not. The zinc simply solidifies still as metal on the surface of the steel.

Q. 25. Much as a film of water would freeze over on a piece of metal? A. Yes. It is the same idea.

Q. 26. Tin plate or terne plate are what kinds of coating? A. So far as the kinds of sheet that have been tinned or terne plated are concerned, they are in exactly the same family with galvanized metal. A metallic layer of tin or terne is applied to the steel base sheet in very much the same manner as zinc. The terne coat, which is a mixture of tin and lead, gives exactly the same sort of a product.

Q. 27. That involves no chemical reaction? A. No chemical reaction at all.

Q. 28. That is, no chemical reaction between the
21 sheet being coated and the solution? A. No.

Q. 29. Now, with respect to the coating which your application provides and describes, and which is placed upon the sheet, how does that differ from the galvanized coating and the tin and terne plate coating? A. The principle by which these coatings are formed is entirely different.

I might say in connection with the galvanized and tin and terne that these metals are simply deposited on top of the steel base sheet, and there is no dissolving off of the steel during this operation.

When a piece of steel or zinc is immersed in a phosphate coating bath, and the bath contains a phosphate, such as zinc phosphate or iron phosphate, because of the acid condition of the bath there is some attack on the metal surface, with the result that a small quantity of that surface is dissolved.

The dissolved metal, along with other phosphates in the phosphating bath, are at once converted, however, to insoluble phosphates, and are deposited by means of this chemical reaction on the surface of the metal which is being coated.

These coatings are completely non-metallic in nature, and are of a finely crystalline structure. They do not have the appearance of a metallic surface at all.

Q. 30. What can you say as to whether or not you or the people with whom you work attempted prior to this invention to provide a means or design or device for applying the phosphate coatings to the sheets at the mill? Had you
attempted that at any time prior to the making of
22 this invention? A. Yes. Attempts have been made
to do that.

There was a considerable field for sheets treated in this way if the sheets could be produced; and we experimented quite extensively in attempting to produce a sheet which would satisfy the trade.

But at that time we were unable to produce a phosphate coating which was adherent enough to the base metal and was sufficiently fine in crystalline nature so that these coatings could be satisfactorily bent and fabricated. The coating would come off; that is, it would pulverize or crumble; and wherever this happened, the surface would be weak both in its resistance to corrosion and in its paint-binding properties.

Q. 31. What can you say as to your ability to produce a coating of uniform appearance and color? A. We could obtain coatings that had uniformity at that time, but this fact did not help us any in solving our problem.

Q. 32. Were you able with wide sheets or broad sheets to obtain a coating of uniform appearance with dark and light colors and so forth? A. Prior to the time of this invention we were never able to produce a completely uniformly coated sheet. The coatings which we obtained, although they were usually non-uniform in some areas as a usual thing, were, however, satisfactory for use on fabricated articles.

Q. 33. That is, you could paint them? A. Yes. I have
seen a great many cases where non-uniformities
23 would be shown by a difference in crystal size on dif-
ferent parts of the same piece of metal. But that
might be perfectly satisfactory on a fabricated article.

But a difference of this kind could not be tolerated on a flat sheet where the entire coating must be of very fine grain and a coarse coating must be completely absent in order to avoid this crumbling during fabrication.

Q. 34. Will you tell how the making of this invention or discovery came about? A. I believe I explained that there was considerable advantage in having a flat sheet which was satisfactorily coated and would hold paint and had sufficient corrosion resistance. One advantage of this would be that a great number of sheets of this kind could be produced from a single installation, and it would not be necessary for customers all over the country each to have his own installation for this purpose.

The advantages of such a sheet were pretty well recognized by everybody familiar with the art, including the American Rolling Mill Company. They had experimented for several years prior to this invention in attempting to produce a sheet of this kind.

One of their first steps consisted of a treatment of galvanized metal with a lime solution. This process, however, decreased to some extent the corosion resistance of the sheet, because it had a dissolving action on the zinc and, besides this, soluble salts were left in the treatment, which were often detrimental rather than helpful to the paint that they used.

After this attempt they continued their efforts
24 with a phosphate type of solution, and here again
they were unable to produce the kind of coating that
was required. The sheets which they produced were invariably blotchy, and there would be large areas where even after the metal had been subjected to the phosphate solution, they would have the appearance of completely bare, untreated metal.

There were other areas which took a coating of sorts, but in these spots the crystals were usually large and were nonadherent and could be easily rubbed or scuffed off from the surface.

Their development was in just about the condition which I just described at the time the Parker Rust Proof Company's assistance was invited in their attempt to produce good sheets.

We had been experimenting in our own laboratory with the solutions for the treatment of galvanized metal for this very purpose. But we had experienced more or less the same trouble that bothered the American Rolling Mill Company.

When we arrived at their plant, and we started our work, we didn't know ourselves just how we were going to produce a satisfactory sheet.

The equipment which was available was pretty much like what was illustrated in the drawing here. That is, there was a long tank for holding the coating solution, at the front end of which were mounted a couple of steel rolls, which served to guide the sheets into the processing bath.

We discarded the phosphate solution which was in the tank and put in our own, and started to run galvanized sheets through this tank in the processing solution in the usual way. And we obtained very much the same kind of non-uniform sheet which the American Rolling Mill had been turning out.

During our preliminary work we noticed that these steel rolls at the beginning of the machine were somewhat scratched and pitted and were also rusty. The pits and rust were leaving marks on the sheet. So we obtained some cloth and wound the steel rolls with the cloth before running any more sheets.

After we had done this, we continued the operation, and noticed that, although there was some improvement in the sheet, in that the scars and spots of rust had been eliminated, we were no closer to producing the kind of sheet which we were all looking for and hoping to get.

During our preliminary work we had cleaned the galvanized sheet by scrubbing it with water and other types of solvent, because it seemed to be reasonable that something was on the surface of the sheet which simply prevented the coating solution from acting as it should. But these preliminary cleaning operations were of no help at all.

After we had wound the steel rolls with cloth, we still thought that perhaps the cleaning was still an important factor. So we wetted the cloth with water and continued to run sheets between the damp cloth-covered rolls; and we immediately noticed on the first sheet a very decided change in the appearance.

These sheets were nothing at all like what we had been accustomed to seeing; but, on the contrary, were uniform over the entire surface. The coating was firmly adherent, and it was of a fine crystalline nature, much different than anything that we had obtained on the sheets before.

26 We were very much pleased with these results. There were people from the American Rolling Mill Company at the installation when this decided improvement took place, and they were also very much pleased and satisfied with the way things had turned out.

In fact, everything was so satisfactory that we started almost immediately on the same day to turn out commercial production with the use of these moist cloth-covered rolls through which the sheets were run prior to being coated.

From that day on we continued to produce commercially acceptable sheets; and the volume of sheets which were run continued to increase week after week and month after month. And shortly the American Rolling Mill Company installed another similar installation in another of its plants, and we produced sheets of a similar nature.

Q. 35. Now, Mr. Thompson, during the time the application was pending before the Patent Office certain prior patents were referred to by the Patent Office. They are, and these are all United States patents, Allen reissue No. 17,484; Saunders No. 1,872,507; Thomas et al, No. 1,360,819; Spear No. 244,153; Shonkwiler No. 1,946,766; and Tanner et al No. 2,067,214. Have you studied and are you familiar with those patents? A. Yes. I have studied and I am familiar with them.

Q. 36. One of the objections as made by the Patent Office was in connection with the patent to Saunders, No. 1,872,507. That objection was, as shown by the record of the application, generally to the effect that Saunders, by spray-

ing the washing solution or cleaning solution upon
27 the automobile body which he proposed to treat subsequently with the phosphate coating solution, obtained the same kind of wetting and the same result as you obtain with these rolls that are disclosed in your application. Now, have you made any tests to determine that question? A. Yes, I have. I have a series of panels which has been prepared, showing the difference in results which are obtained when the metal is alkali cleaned on the one hand and rolled on the other before being coated.

The Court: We will take a recess.

(Thereupon a recess was taken from 12:30 o'clock p. m. to 1:30 o'clock p. m. this date.)

28 *After recess.*

(Pursuant to recess theretofore taken, the consideration of the above-entitled matter was resumed at 1:30 o'clock p. m., whereupon the following proceedings and transactions were had and testimony was taken:)

Proceedings, Transaction and Testimony.

Thereupon John S. Thompson, the witness on the stand at the time of the taking of recess, was recalled and, upon resuming the witness stand, testified further as follows:

Direct-examination (continued).

By Mr. Dickey:

Q. 37. Mr. Thompson, will you state whether or not you ever had any personal experience with apparatus for cleaning sheet metal prior to coating with rust proofing solution, such as shown in the Saunders patent, No. 1,872,507. I hand you a copy of that patent. A. Yes. The Parker Rust Proof Company had an occasion at one time to construct a machine similar to the one shown by Saunders for processing or coating bodies.

Q. 38. What kind of bodies? A. Steel automobile bodies. The body was sent through the equipment. The equipment was very much as shown in the drawing here.

Q. 39. The drawing shown in the Saunders patent? A. The drawing, figure 2, in the Saunders patent. And a solution was fed to the wedge-shape nozzles from the supply tank or bath which is shown in figure 2.

29 Q. 40. Was that a gravity feed or pump feed or force feed? A. It is purely a gravity feed, as shown by the drawings. The solution runs down through pipes, and falls on to the surface which is to be coated, and then falls into a reservoir down below, from which it is pumped again back up to the reservoir on top.

Q. 41. And the force with which the solution is sprayed on is merely the weight of the solution by gravity established in the upper tank? A. Yes. There is no additional pressure exerted. The tank at the top is open to the air.

Q. 42. What can you say as to whether the application of a solution to a body or a liquid to a body by such means as shown in that Saunders patent will give you the result that you get by means of the invention in your application here? A. No. It definitely does not give the results which we obtain. The coatings were non-uniform. It was impossible for us to obtain a uniform, continuous coating on an automobile body. The solution simply fell out of these nozzles, and a good share of it never did touch the metal which is supposed to receive the coating.

Q. 43. How long ago was it that you had that experience? A. That must have been a matter of three or four years.

Q. 44. Was that experience independent of anything connected with this particular application? A. It was entirely separate.

Q. 45. Now, you said before the noon recess that you
had made some tests and had some specimens here that
would demonstrate the type of coating that you get
30 with the use of your invention, the invention in the
application here, and which would also illustrate
something of what you get when you spray the solution
such as is done in Saunders. Have you these panels here?
A. Yes, I have.

Q. 46. Will you come down and explain them to us?

This series of panels has been marked for identification as Plaintiffs' Exhibits 2 to 23 inclusive. Will you, Mr. Thompson, take them up in order and state just what they are as you go through them, so that that will appear in the record?

The Court: I will step down there.

The Witness: Exhibit 2 is just simply a bare zinc-electroplated plate, showing the condition of the metal before anything whatever has been done to it in the way of processing or coating.

By Mr. Dickey:

Q. 47. That is a steel plate with zinc electroplated on it? A. Yes.

Exhibit 3 is a zinc-electroplated plate exactly the same as Exhibit 2, but this sheet has been subjected to a phosphate coating solution.

When the two exhibits, 2 and 3, are compared side by side, there is very little difference between the two. On Exhibit 3 there are a few blotches where the coating has formed or started to form, but over a great majority of the surface there is very little effect noticed from the processing of that.

Exhibit 4 is also an electroplated steel panel.

31 Q. 48 Electroplated with what?

A. Electroplated with zinc.

In this case prior to being immersed in the phosphate-coating solution, this panel was passed four times between a set of rubber rolls that were moistened with water.

Q. 49. How large were those rolls? A. Those rolls are about an inch and a half or two inches in diameter.

You will note here that the panel was passed four times through the rolls. That was to match the coating with the kind of product which we had obtained commercially, where it is only necessary to have one pass of the sheet between the rolls, because the rolls are large and very heavy and it is possible to exert more pressure.

Q. 50. This was done in the laboratory? A. This was a laboratory prepared panel.

Q. 51. And the rolls that were used were what? A. They were ordinary wringer rolls such as are used for wringing water out of clothes.

Exhibit 5 is a zinc electroplated panel of steel. Its surface is electroplated with zinc.

Now, this panel before being phosphate-coated was alkali sprayed. The concentration of alkali, the temperature of the alkali solution, and the time of spraying were all comparable to the conditions as indicated or shown by the Saunders reference.

Then, following the alkali spraying, this panel was subjected to the phosphate solution under the same conditions as Exhibits 3 and 4. You will notice that there is
32 practically no coating on either side of the panel outside of a few blotches.

This panel shows conclusively that cleaning is not responsible for the excellent results which we obtain by the use of these moist rolls.

Q. 52. And the alkali spray was sprayed on in a manner similar to that shown in the Saunders patent? A. Yes.

Exhibit 6 is a zinc-electroplated steel panel that was alkali sprayed exactly the same as Exhibit 5, but prior to phosphate coating the panel it was passed through the moist rubber rolls four times.

Now, that panel has a completely uniform and finely grained coating. This shows that the rolls can completely overcome any effect which is left by the alkali spray. It also shows that even though this panel was perfectly clean after the alkali spray, an additional operation was necessary in order to obtain a good coating on that surface.

By the Court:

Q. 53. Do I understand that before this particular panel is put through the aqueous solution proper that is in the tank of the machine there is an auxiliary process whereby it is put through another auxiliary roller before it is put through the regular roller as depicted in the diagram? A. No. That is not true. Where this exhibit refers to four passes through the rolls, that refers to the regular roller.

Q. 54. Through the entire apparatus? A. Yes. Shown at the beginning of the apparatus.

33 Mr. Dickey: The sheet is run through the rollers once and then back and forth.

The Court: In other words, it does not go into the aqueous solution until after it has been rubbed through the roller four times?

Mr. Dickey: That is right. You see, we were using small rollers in the laboratory. That was done to compensate for the smallness of those rollers as compared with the large rollers used in commercial practice.

The Witness: Exhibit 7 is also a zinc-electroplated steel panel. In this case, in addition to being alkali sprayed, the panel was also brushed vigorously during the alkali spraying, after which the panel was immersed in a phosphate coating solution. There were no rolls involved in the preparation of this exhibit.

Mr. Dickey: That cleaning by brushing or rotary brushing is shown in the Shonkwiler patent, No. 1,946,766. Figure 2 shows it, and figure 3 also shows it.

The Witness: This panel also has practically no coating.

Exhibit 8 is an electroplated steel panel which was alkali sprayed and brushed in the same manner as Exhibit 7, but was then rolled four times with the damp rubber rolls, and then processed in the phosphate solution. You can readily see that that coating is entirely uniform all over the entire surface.

Exhibit 9 is exactly the same as Exhibit 8, with the exception that prior to being processed Exhibit 9 was put through the rolls just once instead of four times, in order to show that there is a very substantial benefit from just one 34 pass. In fact, that one pass is very nearly as good as the four pass panel of Exhibit 8.

Exhibit 10 is also a zinc-electroplated steel panel, and the bottom half of this panel was passed through the rolls four times. Then the entire panel was subjected to the phosphate coating solution.

There is a very definite mark or line of division on the sheet where the rolls were used. The bottom half of the sheet has, of course, a uniform coating on it, whereas the upper half, which was not rolled before being coated, is just discolored, with no evidence of phosphate coating except a few blotches.

Exhibits 11 through 19 correspond in treatment to Exhibits 2 through 10, but the metal being treated is steel rather than zinc.

By Mr. Dickey:

Q. 55. Steel without any zinc coating? Is that correct? A. Yes.

Q. 56. So that that coating is on a steel surface instead of on a zinc surface? A. Yes. That is right.

Exhibit 11 is just an ordinary piece of steel, such as is produced by the steel mill.

By the Court:

Q. 57. And the process is the same with reference to these latter exhibits? A. Yes.

And the same effect of the rolls is shown in every case, and the lack of any benefit is shown by alkali cleaning where no rolls have been used following that.

By Mr. Dickey:

Q. 58. You have used in some cases on the steel panel eight passes instead of four, have you not? A. Yes. It seems to take a little more pressure or more passes to get the same type of coating on steel than it does on zinc, although we have a comparison which shows a very pronounced benefit that is obtained with a single pass.

Q. 59. Which one is that? A. That is Exhibit 18. That has quite a uniform coating.

Q. 60. Exhibit 17 is what? A. Exhibit 17 is identical with Exhibit 18 except that the steel was rolled eight times before processing instead of once.

Q. 61. Have you here a steel panel that was sprayed with alkali and then treated in a manner similar to that as described in the Saunders patent? A. Yes.

Q. 62. Which one is it? A. Exhibit 14 will illustrate that.

Q. 63. What sort of solution did you use on that? A. That was an equeous solution containing zinc phosphate and chlorate and nitrate as oxidizing agents. They serve to accelerate the coating formation.

Q. 64. Is that solution a coating solution that is used commercially? A. Oh, yes. Very decidedly. There are a great many installations over the country that use that process.

36 Q. 65. Have you a panel which was alkali sprayed and then rolled and processed to compare with Exhibit 14? A. Yes. Exhibit 15 will illustrate that point.

Exhibit 15 is gray and uniform, as it should be, whereas the coating on Exhibit 14 is sort of an iridescent affair, and that coating is not as corrosion-resisting as this one, and does not hold paint as well, and it lacks adhesion. That coating is not adherent to the metal.

By the Court:

Q. 66. Is that attributed to the chemical composition of the coating or to the processing? A. It is attributed to the difference in the nature of that steel surface at the time it is subjected to the phosphate coating solution.

Just the difference between the absence of the rolls and the use of the rolls will make that very pronounced difference there in the appearance and in the quality of those two coatings.

Mr. Dickey: Does your Honor have any further questions relative to the panels?

The Court: No. I have no further questions relative to those exhibits.

By Mr. Dickey:

Q. 67. What are Exhibits 20 to 23, inclusive? A. These exhibits were prepared with cadmium-plated steel panels. The surface that is actually treated is of cadmium. They show that the effect of the rolls is just as pronounced with this metal as it is with zinc or iron.

Exhibit 20 is just a plain cadmium-plated panel.
37 It is shiny, has no coating on it.

Exhibit 21 is also a cadmium-plated panel, but was subjected to a phosphate coating solution. That coating is characterized by pronounced blotchiness and the presence of very large crystals in those blotches. You can feel them with your hand.

By the Court:

Q. 68. That was applied by what means? A. That was applied with a phosphate process by the spraying. The process is in common use.

By Mr. Dickey:

Q. 69. The same solution was sprayed on the surface? A. Yes.

Q. 70. But it had not been rolled prior to the treatment? A. It had not been rolled.

Exhibit 22 is a cadmium-plated panel that was alkali sprayed and then processed in the same manner as Exhibit 21. This is a little more uniform in spots, but it is still a very non-uniform coating, and the surface is very sparse. Those large crystals are non-adherent.

Exhibit 23 is a cadmium-plated panel which was passed four times between moist rubber rolls and then processed in exactly the same manner as Exhibits 21 and 22. This coating has an entirely different characteristic and is uniform and fine over the entire surface.

Q. 71. Now, Mr. Thompson, have you some photomicrographs of these panels which you have exhibited here? A. Yes. We have photomicrographs.

38 Q. 72. Will you produce them, please? A. All of these photomicrographs (indicating) were taken at a magnification of 400 diameters.

This one here (indicating) is of the surface of Exhibit No. 5.

Mr. Dickey: Let us mark that "Exhibit 5-A."

The Court: These are merely supplemental of and buttressing the claims made with respect to the exhibits?

Mr. Dickey: That is right.

The Court: Let me ask you this question, if I may: In any of these photomicrographs that have been taken does it appear that the actual molecular structure of the steel might possibly appear? In other words, am I to assume that all that appears in the photograph is the chemical structure of the coating?

Mr. Dickey: No. I don't think that you can assume that.

By Mr. Dickey:

Q. 73. Explain that, will you, Mr. Thompson. A. No. In some of these cases where the coating is very sparse, where there is not much of it, you can identify some of the structure of the metallic surface in addition to the coating.

By the Court:

Q. 74. The reason why I asked the question is this: You have photographs here such as Plaintiffs' Exhibit 5-A. Is the Court to assume that what this depicts is a representation of the coating and that nothing appears in the photograph other than the coating itself? I mean, there is no representation depicted of the structure of the steel? A. No. It is not intended to show the steel.

39 Q. 75. So that the photographs will be presumed to be representative of what the coating looks like? A. Yes. And where that other factor comes in, I can mention it.

By Mr. Dickey:

Q. 76. Let me ask you this, referring to Exhibit 5-A. In that you will notice some large light spots that look like small grains of oats. A. Yes.

Q. 77. Then you will notice to the upper right of that as you look at it here a finer-grained appearance. It does not have these large particles that appear below? A. Yes.

That dark appearance there is the background of the metal. It shows that that metal has not been coated.

The Court: I do not think that it is very important but inasmuch as the photographs are merely offered in support of the claims made with reference to the exhibits, I wanted to make sure of that when it comes time for me to consider the entire matter with reference to the exhibits in general.

By Mr. Cochran:

Q. 78. I would like to ask Mr. Thompson this question in order to qualify him on the composition of these photographs. Did you take them? A. I was present when they were taken.

Q. 79. You can identify each of these exhibits? A. I can. Yes, sir.

Q. 80. Are you qualified to state just which is the surface of the coating and which is the underlying metal surface? A. From my experience I will say that I am. Yes, sir. I have had a great deal of experience in coating these metals, and I know a good coating from a bad one; and I have seen a great many photomicrographs.

The Court: I might say here for the benefit of counsel that the Court is going to view the exhibits themselves as the real evidence in the case; and that the photographs will be offered and will be in evidence for such supplementary support, if I may use that term, as they will give the exhibits.

They will be marked and introduced in evidence. I would suggest that counsel take the individual photograph representing the individual plate and attach it to it.

Mr. Dickey: Will you mark that exhibit "Exhibit 6-A"?

(A photomicrograph was marked "Plaintiffs' Exhibit 6-A".)

By Mr. Dickey:

Q. 81. This exhibit that has been marked "Plaintiffs' Exhibit 6-A" is a photomicrograph of the panel, Exhibit 6; is that right? A. No.

The Court: I forgot to ask with reference to those photographs whether there is any objection to them.

Mr. Cochran: No, your Honor.

A. (continued) That is a photomicrograph of Exhibit 4.

Mr. Dickey: Then I will ask you to change that marking and make it Exhibit 4-A, so that it will correspond.

(The marking on the photomicrograph "Plaintiffs' Exhibit 6-A" was scratched out, and the photomicrograph was marked "Plaintiffs' Exhibit 4-A.")

41 By Mr. Dickey:

Q. 82. Now, referring to photomicrograph Exhibit 4-A, that is a photomicrograph of panel Exhibit 4, which has a uniform good coating? Is that correct? A. That is correct.

Q. 83. And is Exhibit 5-A a photograph of the panel Exhibit 5, which has a sparse coating? A. That is right.

Mr. Dickey: I would like to show those to your Honor, so that you will get the contrast between the two. Exhibit 5 is the one that has a little coating. Four is the one that has a good coating on it.

By Mr. Dickey:

Q. 84. Will you take the stand again, please?

Have you examined the patent to Thomas et al, No. 1,360,819, and the patent to Spear, No. 244,153, cited by the Patent Office? A. Yes, I have.

Q. 85. I hand you copies of those patents. Will you please state how the disclosures and the teachings of those patents differ from the process described in your application? A. The Spear patent is concerned with the automatic production of a galvanized steel sheet, and he claims that when the sheet is passed through the galvanizing bath by automatic means, rather than being handled by tongs or hooks, which was the usual practice, a better-appearing product is obtained.

Prior to the galvanizing operation itself the sheet metal
was pickled in order to remove scale, and was then
42 rinsed with water; and the excess water removed
from the sheet by passing the sheet between the gum
rolls.

Later in the process the sheets are sent through a tank containing a zinc chloride flux, and again the excess of flux is removed by means of rolls.

After that operation the galvanizing operation takes place.

Spear's final product is a steel sheet covered with zinc and ordinarily called galvanized metal.

Q. 86. Does that process involve any chemical reaction between the solution and the surface of the steel sheet? A. No. It does not. This simply features forming a layer of metallic zinc. There is no chemical reaction involved between the galvanizing bath and the steel.

Q. 87. Is there any other use of the rolls there than to remove the excess and dry the sheets by removing the solution? A. No. That is the only purpose that he has, except getting rid of the excess of the solution that he puts his steel through before he galvanizes it.

Q. 88. There is no attempt to wet the sheet before the subsequent operation? A. No. In fact, he does the opposite of wetting the sheet. He wants to get the water and other solution off the sheet.

Q. 89. What can you say as to the patent to Thomas et al? A. The Thomas patent shows an automatic machine for putting a coat of tin or terne plate, which is a mixture of tin and lead, on the steel sheet.

Before applying the tin or terne, the sheet is
43 pickled, and then sent between two sets of rolls,
where water is sprayed on to the sheet in order to
remove the pickling acid. Then the sheet goes through a
final set of rolls, where the sheet is dried; that is, the excess
of the rinse water is rmoved. In this respect the patent is
very much like the Spear reference.

Q. 90. Is there any chemical action occurring there? A. No. No chemical reaction with the metal surface is involved at all.

Q. 91. Are the rolls in that case used to wet the metal surface, or just the reverse? A. They are used to dry the surface. He wants to remove the rinse water.

Q. 92. I hand you the patent to Shonkwiler, No. 1,946,766, which is also referred to by the Patent Office. Will you explain the difference between what is shown there and your process described in your application? A. Shonkwiler is primarily interested in a steel sheet which has a dull surface—

By the Court:

Q. 93. What does that mean? A. Dull, the opposite of shiny.

—and he claims that when paint is applied over such a surface, it has a better lustre, and materials such as porcelain enamel will have a better adhesion.

By Mr. Dickey:

Q. 94. How does he produce that dull surface? A. The dull surface is produced by running the sheet through a sulphuric acid bath containing some nitrate.

44 Prior to sending the sheet through the etching bath, it is washed with alkali and brushed, after which the sheet is dried by wringing it between a set of rolls.

Then, after the etching step, the sheet is again washed, and then is dried by running it through a pair of rolls.

After that operation the metal is annealed and cold-rolled, the same as any other piece of steel, the only difference being in the appearance of the sheet.

Q. 95. Let me ask you whether annealing and cold-rolling after phosphate coating such as you have here—What does that do to your coating? A. The annealing operation would remove the coating, because phosphate coatings are not stable at temperatures such as used in the annealing operations.

Q. 96. The general process shown in the Shonkwiler patent could not be used with the sheet shown in your application without destroying the coating? A. That is correct.

Q. 97. You spoke of etching with nitric acid or with a nitric acid or sulphuric acid bath. What do you mean by "etching"? Will you describe that? A. If I understand what he has, it amounts to a modified pickling operation.

Q. 98. What happens to the surface of the metal in the etching operation? A. It just takes on a dull appearance.

Q. 99. Is it eaten out? A. The metal becomes dull because part of that metal just is removed. It is dis-
45 solved off and goes into solution and stays there.

Q. 100. Is there any coating put back on the surface of the metal by that operation? A. No. He does not intend to get a coating, and there is not any coating.

Q. 101. There is not any coating? A. No.

Q. 102. What does he use his rubber rolls for there? A. He dries his sheets with these rolls after his different cleaning operations.

Q. 103. The purpose of the rolls there is rather to take the water off the sheets than to wet them, is it? A. Yes. He wants to remove water. He wants to dry the sheets.

Q. 104. Does that patent contain any suggestion of rust proofing or phosphate coating? A. No. It does not. He is not concerned with that sort of operation.

Q. 105. This procedure involved in the Shonkwiler patent and also the procedure involved in the Spear and Thomas patents, for galvanizing and then putting a tin coating on—those are conventional, well-known processes, that are followed in the steel mills, are they not? A. Yes. They are.

Q. 106. And those processes are all followed or those operations are all performed before the process described in your application comes into operation? Is that not so? A. That is right. We start our invention where these different references leave off.

46 Q. 107. That is, the purpose of your process is to put a coating on a sheet that has been through all of these processes previously? A. Yes. After it has already been prepared by the steel mill.

Q. 108. Another patent referred to by the Patent Office is the Allen, reissue patent, No. 17,484. I hand you a copy of that. Will you state how that differs from your process, if it does? A. Allen describes a rust proofing method in which he says he prevents the crystal growth of the coating on the metal while the coating operation is taking place by agitating the quiescent processing solution which is adjacent to the surface being coated; and he does the agitating of this solution by slowly moving rolls or pads of cloth or some similar material up and down the surfaces of the metal while the coating operation is taking place.

Our invention is entirely different from this, because we treat the metal which is to be processed prior to the processing operation. In other words, we run the bare metal itself, zinc or steel, between the moist rolls prior to any coating operation at all.

Q. 109. The main difference, then, between the Allen reference and your process is that you treat the surface of the metal prior to the time that the coating solution comes in contact with the metal? A. That is right.

Q. 110. While Allen treats the layer of solution next to the metal surface that is coating the surface while 47 the coating is being performed? A. Yes. Absolutely.

Q. 111. Allen's operation is a rubbing operation, itsn't it, and not a rolling operation? A. That is correct.

Q. 112. The Patent Office has referred also to the Tanner patent, No. 2,067,214. Will you please state just what that relates to, and what relation it has, if any, to your process? A. This patent explains that when a phosphate or other type of coating solution is accelerated by or contains a nitric acid radical, the coating which is formed, or rather, something in the coating, is apt to cause blistering of the paint when it is applied over it; and that the formation of these blisters is avoided by rinsing the phosphate coating with a solution of chromic acid or phosphoric acid or oxalic acid.

Q. 113. That rinsing is done after the coating is formed, isn't it? A. Yes. It is.

Q. 114. And in your application you show that at the last end of the operation of your process there is a chromic acid rinse? A. Yes. We show that.

Q. 115. But that chromic acid rinse takes place after the coating has been formed on the sheet? A. That is true.

Q. 116. It has nothing to do whatever with the action of the rolls or the subsequent forming of the coating after
passing through the rolls? A. No. It is a thing to-
48 tally unrelated to our invention so far as obtaining
the desired coating is concerned.

Q. 117. It is merely a thing that can be used in the process that is covered by your application? A. Yes. In addition to it.

By the Court:

Q. 118. Are you the Thompson referred to as assignor in this so-called Tanner patent? A. Yes.

By Mr. Dickey:

Q. 119. Will you state, Mr. Thompson, whether the apparatus and so forth shown in the Allen patent Reissue 17,484 has been used commercially, so far as you know? A. Not to my knowledge. I have never heard of it being used, and I have never seen it being used, and I have been associated with the rust proofing business for a good many years.

Mr. Dickey: That is all from this witness.

I would like to offer in evidence the panels, Plaintiffs' Exhibits 2 to 23, inclusive, and also the photographs of those panels. These photographs are identified by the same exhibit numbers as the panels, with the difference that the letter "A" appears on them. For instance, the panel here is Plaintiffs' Exhibit 2. The photograph of that surface is Plaintiffs' Exhibit 2-A. These photographs are exhibits 2-A, 3-″, 4-A, 5-A, 6-A, 7-A, 8-A, 9-A, 11-A, 12-A, 13-A, 14-A, 15-A, 16-A, 17-A, and 18-A.

The Court: Is there any objection?

Mr. Cochran: No objection.

The Court: As I indicated, they will be marked and
49 may be admitted.

(Thereupon Plaintiffs' Exhibits 2 to 23 and 2-A to 23-A inclusive were received in evidence.)

Cross-Examination

By Mr. Cochran:

X-Q. 1. Mr. Thompson, would you say that the essence of your improvement or invention here was the use of rolls to squeeze the wet sheet of material just previous to the immersion of it in the rust proofing? Is that the point of improvement that you say is your invention? A. The use of the moist rolls exerting pressure on the sheet is an illustration of how we produce these good coatings. Yes.

X-Q. 121. Would you say that the squeezing of it is necessary by some such means as rolls or other means exerting a squeezing effect? A. So far as we know, that seems to be the case. There must be some positive pressure exerted upon the sheet while it is moist in order to get this result.

X-Q. 122. I understood your testimony as to one of your exhibits to be that the scrubbing of the exhibit with brushes would not be sufficient to give it such a surface as would take the rust proofing in this way? A. That is true. I did testify to that. Those panels to which you refer were alkali cleaned and scrubbed at the same time, and that would mean that the scrubbing in the presence of the alkali cleaning just does not mean anything. The panel was about the same in appearance when the scrubbing was omitted.

50 X-Q. 123. Certain of the claims that you have made
in your application do not recite the squeezing ac-

tion or passage of the sheet between rolls with the squeezing action? Would you say that those claims define invention? I have reference to claims 20, 21, and 25.

Mr. Cochran: I may say, your Honor, that those claims are to be found in part H of Exhibit 1 that I handed to your Honor.

A. These claims are talking about reducing the surface tension of the water applied to the sheet prior to the coating operation.

Now, we don't know exactly just what is the explanation of why we get the results that we do. We do know that when we pass the sheet between rolls and the sheet is in a moist condition, we do get the results that we say we get.

The pressure of the rolls or whatever means is used is probably sufficient to squeeze water down into the little imperfections, cracks, and crevices in the surface of that metal, so that a thin film of water is pushed down into these holes and spread over the entire surface of the sheet uniformly.

That seems to be an essential thing to the success of our invention. If the means which are being used to apply pressure in the presence of moisture are not sufficient to get the moisture down into these crevices and microscopic holes, apparently we do not get what we want.

By Mr. Cochran:

X-Q. 124. Is it not a fact well known to chemists that if you wish to have some solution act on some surface, 51 it is advantageous to wet that surface first with water, in order that the solution will act on the surface uniformly and instantaneously, so to speak, all over it? A. Well, ordinarily the chemist is working with aqueous solutions; and he cannot very well help but get whatever he is working with wet if he sticks it into the solution.

X-Q. 125. That is not what I meant to ask you. I meant to ask, Is it not advantageous to first wet the object with water before applying the chemical solution to it, in order that the chemical solution will react uniformly and instantaneously over the whole surface? A. I understand your question, but I was just trying to think of a case where that would be true. But I can't think of any.

X-Q. 126. You have had some experience with developing photographic films, have you not? A. Oh, no. I am not much of a photographer.

X-Q. 127. You did not do this photographing yourself? A. I was present when it was done.

X-Q. 128. Then you do not know that it is a fact that it is the practice to wet things with water first before you apply a chemical solution to them where you expect to get a treatment of the surface? A. Chemistry is a big field. What kind of material are you talking about? I can't think of a case that would comply with what you are thinking.

X-Q. 129. In so far as you know, it is not the practice to wet the object first? A. It may be; but if it is the
52 practice, I don't know it. I am not familiar with it.

X-Q. 130. I think you testified as to the Shonkwiler patent and the Thomas patent that the rolls were drying rolls. For instance, in the Shonkwiler patent, as I recall, you testified that the roller 8 is a drying roller? A. Yes, sir. I did.

X-Q. 131. Does it say in the patent that it is a drying roller? A. On page 2, the first column, lines 31 and 32, he refers to the roll 8 as wringer rolls.

By the Court:

XQ. 132. You refer to the Shonkwiler patent now? A. The Shonkwiler patent.

XQ. 133. Page 2? A. Page 2, column 1, lines 31 and 32. He refers to those rolls as wringer rolls. and they are made of soft rubber, and they are used for removing excess moisture.

By Mr. Cochran:

XQ. 134. Is that what you mean by "drying"—removing excess moisture? A. Yes.

XQ. 135. You don't actually dry it out, do you, with those rolls any more than your rolls dry out yours? Your rollers are presumably the same type of roller as used here, are they not? A. Generally speaking, yes. They are rubber rolls.

XQ. 136. The Shonkwiler rolls would not dry out the sheet any more than your rollers would dry out the sheet;
isn't that so? A. Well, I don't know. He wants to
53 remove the water. I don't think that his sheet would
be entirely dry.

XQ. 137. Do you know any reason to suppose that the action would be any different as between his rolls and your rolls? A. I don't know why it could be assumed that they would be the same.

X-Q. 138. They are both rubber rolls, are they not? A. Yes.

XQ. 139. You use heavy pressure on yours, do you not? A. We use enough to get the result that we are after.

XQ. 140. And that is a very heavy pressure on the sheet, is it not? A. Well, I don't know that I would call it heavy pressure. I would call it a positive pressure.

XQ. 141. Now, as to the other patents, let us take the Thomas patent. I think you testified that rolls 9 there were drying rolls, shown in figure 1 and also in figure 2. Do you find anything there that would show that they are drying rolls? A. Thomas is concerned with tin or terne coating steel sheets. He certainly would not want water running from that rinsing operation down to his tin or his terne coating bath. So it must be his intention to get that sheet pretty dry before it gets down in there. And it is not a very far distance from those rolls to the terne coating bath, I would say.

X-Q. 142. You don't have a thing in th patent that specifies whether they are drying rolls or not, do you? A. Not
specifically. But it would be pretty clear just from
54 looking at the drawing that he would not want his
sheet wet at that stage.

XQ. 143. Now, going back, if you please, to this Shonkwiler patent; and please refer to the rolls 8 again and the scrubbing brushes 7 and the spray 6. Is it your view that the spray 6 and scrubbers 7 and rolls 8 would act to wet thoroughly the sheet going through there? A. The purpose of that scrubber is to remove oil that has been applied for the purpose of temper-rolling. He specifically says that he can use alkali there or he can use water, but he does not show both.

Now, it has not been my experience that you can make a surface which has been oiled free enough of oil simply by spraying it with water so that you will get uniform coverage of that sheet with water. On the other hand, if he simply resorted to alkali, he would leave an unfavorable condition on the surface of that sheet.

XQ. 144. But in your case, if you had oil on the sheets and you send them through those rollers, those rollers would not affect the thorough wetting of the sheet there, would they? A. No. I don't think so.

XQ. 145. Then my question is, Under the same conditions as obtain in your structure would not the Shonkwiler rolls wet the sheet of metal the same as your rolls do? A. If the sheet of Shonkwiler was a finished sheet, ready to be used, if it had the right temper and the right sort of surface condition, and was ready for the structure to be fabricated, and its surface was free enough of oil, and if he had
55 pressure enough on his rolls to get this uniform layer
of moisture over the surface, and he subjected it to a phosphate solution, he would undoubtedly get the same results that we do.

But he is concerned with no set-up of that kind. He simply washes his sheet prior to a modified pickling process here, in which all he does is remove the metal and form a rough or pitted surface. He removes metal after he puts his metal sheet between the rolls.

It is strictly a metal-dissolving operation, and has nothing to do with a method of coating metal with non-metallic, corrosive-resistant, paint-holding coating.

XQ. 146. My question there was this, Mr. Thompson: whether or not under the same conditions with the same kind of sheet his rolls would not accomplish the same purpose, namely, to wet the sheet thoroughly. A. That is a matter of speculation, because I don't know how clean he gets his sheet. I don't know how much oil he has on it. I don't know how long he keeps it in. I don't how how much oil there is on his rolls.

XQ. 147. Now, will you turn to the Spear patent. That is Part A of the defendant's exhibit. I believe that you now have the patent of Spear before you? A. Yes.

XQ. 148. And the sheet of metal, you will note, has passed through a tank C at one stage of the operation, for the purpose of scrubbing the sheet with brushes, and then through rollers B-2. And then I think you said that it goes into a tank shown as containing zinc chloride flux. Is that
56 right? A. Yes. He says he may use either dilute muriatic acid or chloride of zinc in the bath.

XQ. 149. In other words, zinc chloride or hydrochloric acid, either one? A. Yes.

XQ. 150. What is meant by the word "flux" there? I don't understand that. I am asking for information. Is there any difference between that and "solution" in your mind? A. A flux can be a solution; but a flux is, you might say, a special solution that prepares a surface to take an adherent coating of metallic zinc.

XQ. 151. In this particular case it is an aqueous solution? A. Yes. It says that it is.

The Court: That is the technical definition of the term "flux"? We have a colloquial, generic term that "A thing is in a state of flux." To the average mind that connotes something entirely different.

Mr. Cochran: Yes. That is why I questioned it—because, although I didn't think it was so important here, I merely wanted to make it clear that it was a water solution instead of any molten mass or anything like that.

The Witness: Yes. I would like to emphasize the point, though, that it is a water solution of either hydrochloric acid or zinc chloride.

The Court: Now you are going to tank D in the figure here. I didn't understand whether you said "D" or "B."

Mr. Cochran: "D", your Honor.

By Mr. Cochran:

XQ. 152. Now, when the sheet comes to tank "C", it has water on it, doesn't it? A. Yes.

57 XQ. 153. It passes rolls B-2. Is there any reason to suppose that they would not act in the same way as your rollers do, to squeeze water into the sheet and at the same time remove the excess of it? A. That is the purpose of using the rollers,—is to remove the excess of water.

XQ. 154. That is just what your rolls would do, isn't it? When you spray water on from pipe 21 in your drawing, your rolls spread the water out and remove the excess? Is that right? A. Yes. That is true.

XQ. 155. Now, coming to the last claim that you have in the case here, the mention of the use as a rinsing solution of chromic acid, phosphoric acid, or oxalic acid. There is nothing new about that, is there? A. No. They are not new. That is in there as an additional step to our actual invention. Our success does not depend on that chromic acid rinse.

XQ. 156. That is the sort of step that has been used before with other processes? A. Oh, yes.

XQ. 157. As a final step? A. Yes.

Mr. Cochran: That is all I have.

Redirect Examination

By Mr. Dickey:

Re-D. Q. 158. Do you find in the Shonkwiler patent
58 any suggestion or teaching of the idea of wetting the surface of the sheet by means of a roller under pressure preparatory to the chemical reaction which applies or deposits the non-metallic coating on that sheet? A. No. There is no suggestion of any kind in any of these references of forming a non-metallic coating by means of a chemical reaction on the surface of a sheet.

Where these patents refer to rolls for one purpose or another, these rolls are simply used in intermediate processes during the preparation of the sheet itself, which in every case, when Shonkwiler or Thomas or Spear are all through with their invention, they still have nothing but a metallic surface. In one case it is steel, in another case it is zinc, and in the other case his surface is either metallic tin or a mixture of tin and lead. They are metallic surfaces in every case.

Re-D. Q. 159. Is there any suggestion in those patents of using the rolls for pressure-applying elements to the surface preparatory to a subsequent chemical reaction? A. None whatever.

Re-Cross-Examination

By Mr. Cochran:

Re-X-Q. 160. There is nothing new in the way you apply the rust proofing to your sheet, is there? It is all in the preparation of the sheet for the rust proofing operation? A. The phosphate solutions in themselves are old.

Re-X-Q. 161. And the way you apply them is old? A. The way we apply them is old except that we must send the
sheet between rolls or subject them to mechanical
59 pressure of some kind in the presence of moisture in
order to get this result.

Re-X-Q. 162. That is the preparation of the sheet? A. That is correct.

Re-X-Q. 163. It is not the application of the rust proofing? A. That is correct.

Mr. Cochran: That is all.

Mr. Dickey: I think that is all from this witness.

(Thereupon the witness was excused and retired from the witness stand.)

Mr. Dickey: If the Court please, we have a demonstration apparatus set up. If we have sufficient time, we can put that demonstration on this afternoon. We have two more witnesses. They are not long witnesses.

The Court: It doesn't make any different to the Court. I assumed that you would follow in chronological order.

Mr. Dickey: Your Honor, suppose we put those two witnesses on and then go through the demonstration.

The Court: Let us have the demonstration now, if there is no objection.

Mr. Cochran: No objection.

Mr. Dickey: Let us go.

(Thereupon all parties and witnesses and the Court proceeded to the witness room at the end of the corridor, where the following proceedings took place:)

Mr. Dickey: Let the record show that the Court adjourned to a room for demonstration of the apparatus.

(Mr. John S. Thompson thereupon testified as follows, during the demonstration of the apparatus:)

60 By Mr. Dickey:

Re-D. Q. 164. Mr. Thompson, will you describe for the record what the demonstration is to be and what you are going to do? A. We will show the effect on both iron and zinc surfaces where in one case the sheets will be processed without any preliminary treatment except one end of the zinc and steel panels will be put through the moist rubber rolls.

Re-D. Q. 165. When you say "processed," do you mean subjected to the phosphate coating solution? A. To the phosphate coating solution. Yes.

Re-D. Q. 166. What sort of coating solution are you going to use in this demonstration? A. When we process the steel we will use a solution which is sprayed. The solution is heated. The solution contains zinc phosphate, nitrate, and chlorate.

Re-D. Q. 167. Is that a commercial type of solution that is being used commercially? A. Yes. It is being used very extensively.

Re-D. Q. 168. Is the solution to be heated? A. The solution is heated. Yes.

Re-D. Q. 169. To what temperature? A. To about 130 or 135 degrees Fahrenheit.

Re-D. Q. 170. It is contained in what? A. It is contained in a laboratory spraying machine.

The solution is sprayed against the panel, and then returns to a reservoir and is recirculated and resprayed.

We will use a processing time in the phosphate solution of one minute.

Re-D. Q. 171. All right. Go ahead. A. When we
61 process the zinc, the phosphate coating solution will
be used by immersion. That is, the panels will be
immediately immersed in a body of the solution. This solution is also heated approximately to 140 degrees Fahrenheit. The solution contains zinc phosphate, ferrous phosphate, nitrate, and a small trace of copper.

Re-D. Q. 172. Is that a commercial type of solution? A. Yes. It is in extensive use.

We will also show the effect of alkali spraying zinc and steel panels, and the effect on the alkali-sprayed panels of the rubber rolls by rolling the bottom half of each panel before processing in the phosphate solution.

Re-D. Q. 173. The alkali spraying takes place before any phosphate coating solution is applied? A. Yes.

Re-D. Q. 174. All right. Go ahead.

(The witness proceeded to demonstrate the apparatus.)

A. It does not make much difference in the appearance of this metal whether it is rolled or not.

By Mr. Dickey:

Re-D. Q. 175. What are you immersing it in there? A. This is the zinc and iron phosphate solution containing nitrate and a trace of copper.

Re-D. Q. 176. What has been done there? A. The panel is simply being water rinsed.

Re-D. Q. 177. Now the panel is being dried? A. The was blown dry with compressed air.

This panel on inspection shows three different appear-
ances. The top inch or so stuck out of the processing
62 solution and received no coating whatever.

Re-D. Q. 178. Let us identify that panel as Exhibit 24. That is a zinc-coated steel panel? A. Yes.

Re-D. Q. 179. And was treated in accordance with the treatment that you described with respect to the zinc-coated panel? A. Yes.

Re-D. Q. 180. All right. A. The next portion of the panel from the top down was immersed in the processing solution, but was not rolled prior to coating. This has very little coating on it, and the coating is very blotchy, what there is of it.

The bottom half of the panel, which was put through the rolls before coating, shows a uniform, continuous coating; and there is no evidence at all of a metallic surface. That area which was rolled has been completely converted to a non-metallic coating.

Mr. Dickey: We offer that panel as Plaintiffs' Exhibit 24.

By the Court:

Re-D. Q. 181. Let me ask a question here. Is this last operation, that was called the rinsing operation, the one that is set forth in claim 26? A. No. That is just ordinary water. It is just simply to rinse off the salts that might be left from the coating operation. It has nothing to do at all with the final appearance of the panel.

The Court: Is there any objection to that panel going into evidence?

63 Mr. Cochran: No.

The Court: It may be admitted.

(The panel just processed by the witness was received in evidence and marked "Plaintiffs' Exhibit 24.")

By Mr. Dickey:

Re-D. Q. 182. All right. What is this? A. This zinc-plated panel will be sprayed with an alkali solution for one minute.

Mr. Dickey: Let us identify that panel as Exhibit 25.

A. (continued) The solution is heated to about 180 degrees Fahrenheit.

The panel is being agitated while spraying in order to insure uniform contact of the panel with the sprayed solution.

The panel is being rinsed with ordinary water to remove the adhering alkali solution.

Re-D. Q. 183. Show that to the Court before you roll it, will you? A. The panel is being given four passes through the moist rubber rolls.

The panel has been immersed in the same solution as Exhibit 24.

Then the panel is rinsed with clear water.

Now the panel is blown dry with compressed air.

The upper inch or so of this panel was not immersed in the processing solution—

Re-D. Q. 184. That is, the inch or so containing the hole? A. Yes.

—whereas the rest of this half of the panel was immersed
in the coating solution at the same time and under
64 the same conditions as the bottom half.

The portion which was alkali cleaned and processed and not rolled before processing is very similar in appearance to the extreme top of the panel, which has not been processed, both areas having a decidedly metallic appearance, whereas the bottom half of the panel, which received the roller treatment, has a uniform continuous coating.

I might mention that the zinc-electroplated panels are about as clean a metal surface as it is possible to obtain. After the plating operation itself the plated surface is thoroughly rinsed at least twice with clear water.

So this panel shows that cleaning is not responsible in this case for the excellent coating obtained. The half which was alkali sprayed has practically no coating, whereas the bottom half, which receives exactly the same amount of alkali spray, but was rolled, has an excellent coating.

Re-D. Q. 185. You spoke of the zinc-plated panels being clean and having been rinsed twice with water. When did that rinsing occur? A. That occurs immediately after the plating operation.

Re-D. Q. 185. After the zinc plating operation? A. After the zinc plating operation.

Re-D. Q. 186. So that as you get those sheets from the zinc-plating operation, they are clean and without any grease or other dirt? A. Yes. They are perhaps as clean as it is possible to get a metal surface.

Mr. Dickey: I offer that panel, Exhibit 25, in evidence.

The Court: Is there any objection?

Mr. Cochran: No.

The Court: It may be admitted.

(Thereupon the panel just processed by the witness was received in evidence and marked "Plaintiffs' Exhibit 25.")

By Mr. Dickey:

Re-D. Q. 187. What is next? A. This is an ordinary steel panel.

Mr. Dickey: Let us identify that as Exhibit 26.

A. (continued) It has been dipped in water and rolled eight passes between moist rubber rolls on the bottom half only.

It is sprayed for one minute at about 135 degrees with a zinc phosphate solution containing nitrate and chlorate.

The panel is being rinsed with water.

The panel is being blown dry with compressed air.

The upper half of this panel has a very mottled appearance and of a color not at all typical of a phosphate coating. Such a coating is non-adherent to the metal and does not serve as a good paint base.

The bottom half of the panel, which was run through the rolls, is of a color typical of good phosphate coating, and is uniform and firmly adherent.

Mr. Dickey: We offer that panel as Exhibit 26.

The Court: It may be admitted.

(The panel just processed by the witness was received in evidence and marked "Plaintiffs' Exhibit 26.")

The Witness: I might say here that this stock was received, this steel, from the steelmill in an unoiled condition. 66 It is not contaminated in any way by slushing oil or other material which is sometimes used to protect the metal from rusting. So it is therefore in an exceptionally clean state.

By Mr. Dickey:

Re-D. Q. 188. What is next? A. The next will be a steel panel.

Re-D. Q. 189. We will call that Exhibit 27. A. We will alkali spray it for one minute.

Re-D. Q. 190. When you say "alkali sprayed," you mean that it is alkali cleaned? A. Yes.

Re-D. Q. 191. Prior to the coating? A. Prior to the coating operation.

The panel is next water rinsed to remove any adhering alkali solution.

The lower one-half of the panel away from the hole is then given eight passes between moist rubber rolls.

Then the entire panel is being sprayed for one minute with the phosphate solution containing chlorate and nitrate.

It is then rinsed with clear water and blown dry with compressed air.

The upper half of the panel has a very blotchy, non-uniform coating, not at all typical either of the appearance or color of a good phosphate coating. The lower half is uniform, of a characteristic color of a good phosphate coating, and is adherent to the steel.

Mr. Dickey: I offer that panel in evidence as Exhibit No. 27.

The Court: It will be admitted.

67 (The panel just processed by the witness was received in evidence and marked "Plaintiffs' Exhibit 27.")

By Mr. Dickey:

Re-D. Q. 192. Referring to Exhibit 26, the upper half of panel 27 seems to be somewhat more uniformly coated after the alkali cleaning than Exhibit 26, which was not cleaned, does it not? A. Yes. It is a little more uniform, but the coating is still by no means typical of a phosphate coating.

Mr. Dickey: Would you like to ask some questions?

Mr. Cochran: No.

The Court: Is that all as far as the demonstration is concerned?

Mr. Dickey: Yes.

The Court: Then we will adjourn until tomorrow morning at 10 o'clock.

(Thereupon, at 3:40 o'clock p. m., an adjournment was taken until the next day, Thursday, January 8, 1942, at 10 o'clock a. m.)

68 In the District Court of the United States
For the District of Columbia

Civil Action No. 7741.

John S. Thompson and Harold J. McVey, *Plaintiffs*,

v.

Conway P. Coe, Commissioner of Patents, *Defendant*.

Washington, D. C.,
Thursday, January 8, 1942.

Pursuant to adjournment theretofore on January 7, 1942, taken, the above-entitled cause came on for further hearing and trial at 10 o'clock a. m., Thursday, January 8, 1942, in the District Court of the United States for the District of Columbia, in the court house in the City of Washington,

Before

Honorable Matthew F. McGuire, Associate Justice of the District Court of the United States for the District of Columbia, there being

Present:

Arthur W. Dickey, Esquire, and Richard P. Schulze, Esquire, for the plaintiffs;

W. W. Cochran, Esquire, for the defendant.

Thereupon the following proceedings and transactions were had and testimony was taken:

69 *Proceedings, Transactions and Testimony.*

Thereupon Harold J. McVey, one of the plaintiffs herein, was called as a witness for and in behalf of the plaintiffs, and being then and there duly sworn by the Clerk of the Court, assumed the witness stand and, upon examination, testified as follows:

Direct examination.

By Mr. Dickey:

Q. 1. Are you the Harold J. McVey who is named as co-inventor in the application for U. S. Patent filed by John S. Thompson and Harold J. McVey on April 26, 1937, Serial No. 138,868? A. I am.

Q. 2. What part did you have in the making of this invention, Mr. McVey? A. At the time of the invention Mr. Thompson and I were engaged in installing the Bonderizing process at the American Rolling Mills in Middletown, Ohio. It was a new venture on our part, since we had never been able to make a process which would work in the steel mill before.

Various attempts had been made by our company and by others in the field to produce a sheet of this kind. The American Rolling Mill itself had attempted to produce a lime-dipped sheet of their own, which they called the Paint Grip. This product was not very satisfactory, because it lowered the rust resistance of the galvanized sheet over the original condition of the sheet, and was not giving a satisfactory result at all. The surface of the sheet was not coated enough to prevent the interaction of the zinc with the paint. 70

It was well recognized by the industry that a phosphate coating such as was applied to manufactured articles or fabricated articles would be advantageous in this field. The American Rolling Mill had themselves made an attempt, and also had equipment installed, to produce a phosphate coating on galvanized sheet metal. Mr. Thompson and I tried various means of producing a desirable coating on the sheet, without success.

When we left our laboratory two days before this invention, we had no idea just exactly how we were going to lick this problem. We attacked it only with the feeling that by working on it we might arrive at some satisfactory means.

Q. 3. Were you and Mr. Thompson working on the matter simultaneously at the time you made this discovery? A. We were both there on the premises and working at the job of trying to find a process that would be successful.

Q. 4. Were you working together? A. Yes.

Q. 5. By whom was the suggestion made that resulted in this discovery? A. Under the circumstances it was very difficult to remember just exactly what any one person said or did. There is no way of knowing in my mind exactly who suggested or did any one certain thing. But the problem was taken care of by both of us at that time.

Q. 6. Now, Mr. McVey, will you tell us something of the time that is allowed for coating the sheet at the mill? A. The time for coating the sheet at the mill must be as short
as possible to be practical. A one-minute processing
71 time would be considered the maximum that could be
allowed, and then only if there was no other way to
obtain the same result.

At the present time they are trying to operate and are operating a process of this nature in from seven seconds up to one minute, although thirty seconds is the maximum time than any particular installation is operating at at this time. That is, they were installed for a higher processing time, but every effort was made to obtain a quicker speed, and it has been speeded up.

Q. 7. Can you tell us the reason why it is that these short times are required at the mill? A. The cost of doing the operation is a prime consideration. When you consider speeds of upwards of 250 feet a minute, which is about the present goal on this type of sheet that we are now working on, a minute processing would require one tank 250 feet in length. The subsequent rinses themselves would require approximately the same amount of space.

Now, when you consider installing a piece of equipment 500 feet in length, you have quite a problem on your hands. When you are trying to sell a man equipment to make something that he is going to sell for a few cents a thousand square feet, it just isn't practical for him to build a building to house such a piece of equipment in as shown by the value of it.

That is the reason why we made every attempt to cut the processing time. They are now operating satisfactorily and will operate satisfactorily at seven seconds.

Q. 8. Is it necessary, in order to have any commer-
72 cially practicable operation, to have those short
operating times? A. Yes, especially on certain types
of sheet metal.

Q. 9. Now, what can you say as to this problem: In order to get a coating that is fine-grained and one that won't powder off and flake off and break off when forming the metal up and shaping it up and bending it, is it necessary that the coating be applied rapidly? A. We have found that it is preferable to apply the coating rapidly in order to gain a small, dense crystalline structure. The entire sheet must be in such condition when it enters the solution that the attack takes places almost immediately. In this manner the crystal growth is controlled and there is a very fine structure.

Q. 10. That is, the chemical reaction on the surface of the sheet must taken place instantly and uniformly over the surface of the sheet? A. Yes.

Q. 11. In order to get the fine type of coating that is required? A. That is right.

Q. 12. Is this process described in the application important in enabling you to get that type of coating? A. In applying coatings of this nature we have never been able to operate commercially successfully without using that principle.

Q. 13. Now, Mr. McVey, I forgot to ask you where you are employed? A. I am employed by the Parker Rust Proof Company.

Q. 14. How long have you been employed there?
73 A. Since 1935.

Q. 15. What is your age? A. Thirty-two.

Q. 16. What is your occupation or profession? A. By profession I am a chemist. My work with the Parker Rust Proof Company brings me in contact with the sales and engineering and research and service departments.

Q. 17. Just what is the nature of the work that you do? A. I am more or less the contact man between the research and the sales departments and our customers.

Q. 18. You travel around and aid the sales department in selling processes and installing processes and getting them in working order and things of that nature? A. My job is to develop new processes and get them in satisfactory commercial operation, especially in steel mills, and to service the processes that are already installed in those steel mills.

Q. 19. Mr. McVey, have you had any experience in selling the process described in your application to operators of steel mills? A. When the job of selling comes to the point where they are considering the installation and operation of equipment, it is usually my task to work with the engineering department in designing that equipment and installing it, and with the chemical department in the operation, to see that it operates.

In doing that it has been my experience that usually when you suggest to the engineering department that they install rubber rolls and keep them moist, at the be-
74 ginning of this process, they are loath to do the same

because of the expense of the rubber rolls. They can see no reason why that should work any better than anything else. Ordinarily we have to get them to come to the shop and demonstrate it in our laboratory, or we have to do that in their laboratory, to show them the necessity of installing this apparatus.

Q. 20. You have found that it is necessary to make such demonstrations to customers? A. It has to be made clear to them, because it does not appear— They have seen that operation performed in other ways, and it does not appear to them that it would do any good. To them it is just another means of getting the sheet in the tank.

Q. 21. Now, can you tell us, Mr. McVey, what uses have been made of this process by other companies besides the American Rolling Mill Company; and if there are such uses, name the company and the use that is being made of the process? A. This process has been installed in the plant of the Bethlehem Steel Company at Sparrows Point, Maryland, and is being used to phosphate coat electro-galvanized steel that goes by the name of Bethanized.

This product is used to my knowledge on such materials as metal bathroom tile, on refrigerators, for washing machine parts, and the like.

The Carnegie Illinois Steel Company at Gary, Indiana, also has installed the process on hot-dipped galvanized steel, on such materials as are used for roofing, gutters, downspouts, and shower cabinets, wherever a galvanized sheet is required by the industry in that trade and can be obtained. It is especially used in the Coca-Cola type
75 of refrigerator cabinet and the like.

This process has also been installed at the Acme Steel Company at Riverdale, Illinois. This particular plant is operating on electro-plated zinc steel, and specializing in the making of Venetian blind slat material. This material has been commercially accepted for that purpose.

In each case before mentioned the equipment has been installed, including the rubber roll moistened with water to introduce the sheet into the bath.

Q. 22. Is it in use at the Republic Steel Company? A. The Republic Steel Company at Monroe, Michigan, are also using it for electroplated galvanized steel.

Q. 23. Can you think of any others? A. The Thomas Steel Company at Warren, Ohio, are also making Venetian blinds with this process.

The Newport Rolling Mill at Newport, Kentucky, is processing hot-dipped galanized steel.

The American Rolling Mill Company, as has been stated, has two installations.

They are now working at the American Rolling Mill plant at Butler, Pennsylvania, on an installation which will apply it to zinc Venetian blinds, principally wide sheets, in order to conserve zinc.

This problem is also in the stage of development in the Bethlehem Steel Company and in the Republic Steel Company.

Q. 24. How will this aid in conserving zinc? A. We have found that a thin coating of zinc Bonderized can be shaped
and handled in the same way as hot-dipped galvan-
76 ized sheets have been handled, and, when painted,
will produce the same satisfactory results as the hot-dipped galvanized sheet that has been produced, for gutters, downspouts, roofing, and the like, which are very important.

Q. 25. Do they use less zinc in treating the steel before Bonderizing or phosphate coating it with your process than they do with a galvanize? A. Yes. This process will only use three pounds per ton of roll. It is a saving of almost ninety-five per cent of the zinc.

Q. 26. What does the galvanize use? A. It runs about 300 pounds to the ton.

Mr. Dickey: That is all.

Cross-Examination

By Mr. Cochran:

X-Q. 27. Mr. McVey, am I right that the essence of your alleged invention is the use of these rolls at that stage of the manufacture, coating of steel? A. That is right.

X-Q. 28. And you don't remember who it was that suggested the use of these rubber rolls? A. The only thing that I can say about that is that we were there working on the job, and it may have been discussed, probably was, and that the thing was done by both of us working on the job.

X-Q. 29. Are you sure it was not some third party who suggested it? A. No. Not at that time. We were on the spot, so to speak. We were not getting any help from anybody.

77 X-Q. 30. Are you sure you didn't get the suggestion from the Spear patent or the Shonkwiler patent? A. I never would have expected to get that result from doing it in that manner.

Well, of course, in the light of present-day knowledge, if I were asked by a manufacturer if I could use this tank out there to do this job, I might say, Well, temporarily we could. But so far as disclosing any idea of how to do the job, certainly it was not impressed on me, anything that I have seen of that kind before.

Mr. Cochran: That is all.

Redirect Examination

By Mr. Dickey:

Re-D. Q. 31. Have you examined the Spear patent and the Thomas patent and the Shonkwiler patent, which are referred to by the Patent Office in connection with your application, Mr. McVey? A. Yes.

Re-D. Q. 32. Will you state whether or not you had seen those patents at or prior to the time that you made this invention? A. At the time or prior to the time we had no reason to investigate the field of hot-dipped galvanized or zinc plating at all. Naturally I had not seen those patents at that time.

Re-D. Q. 33. When was the first time that you saw them? A. When they were brought up in this file.

Mr. Dickey: I think that is all.

(Thereupon the witness was excused and retired from the witness stand.)

78 Thereupon Edwin W. Goodspeed was called as a witness for and in behalf of the plaintiffs, and being then and there duly sworn by the Clerk of the Court, assumed the witness stand and, upon examination, testified as follows:

Direct Examination

By Mr. Dickey:

Q. 1. What is your age? A. Thirty-eight.

Q. 2. Where do you reside? A. Detroit, Michigan.

Q. 3. What is your occupation? A. I am a research chemist.

Q. 4. With whom? A. With the Parker Rust Proof Company.

Q. 5. Mr. Goodspeed, are you familiar with the process invention described in the application for U. S. patent to John S. Thompson and Harold J. McVey? A. Yes, I am.

Q. 6. Serial No. 138,868? A. Yes.

Q. 7. Have you made any investigation, Mr. Goodspeed, with respect to the benefit and usefulness of this invention in connection with the painting of panels, and have you anything that would demonstrate that? A. Yes. I have done that.

Q. 8. Will you produce those and explain them? A. I have here four panels. They have been marked Exhibits
79 28, 29, 30 and 31. The panels are steel panels which were plated with two one hundred thousandths of an inch of zinc. They were electroplated with that amount of zinc.

Q. 9. Is that ordinary stock? A. Yes. That is right.

The panel, Exhibit No. 28, was processed in one of our phosphate coating baths with no other treatment prior to processing. This is just as it came from the plating solution, and cleaned and dried.

Q. 10. Was this processed with the phosphate coating solution? A. Yes. It was.

Q. 11. This is Exhibit 28? A. That is right.

Q. 12. What is Exhibit 29? A. Oh, I am mistaken. I am sorry. This is Exhibit 28. Exhibit 28 was not processed. Exhibit 28 had no treatment whatever prior to painting after it came out of the zinc electroplating bath.

Q. 13. Then what was done with it after it was painted? A. Do you want me to carry this history down as to what was done there?

Q. 14. Yes. A. After it was electroplated, it was given this little bump in the center with a machine which is capable of giving a draw of this type and exact depth. Then the whole panel was painted with an ordinary commercial paint, and subjected to a salt spray test for 119 hours.

Q. 15. Tell us what this salt spray test was that
80 you are talking about. A. That is a salt spray or salt
solution consisting of about 20 per cent of ordinary
salt. This is sprayed continuously in an enclosed room, so that that room is always full of this mist of salt spray. The panel is just bathed in this salt all the time.

I forgot to mention this: Before the painted panel was put in the salt spray, a scratch was made down the center, like you see here. That gives the salt spray a chance to get right down to the metal itself, and perhaps work underneath the paint, if the paint is not very adherent or becomes less adherent during the test.

Q. 16. Let me ask you this: Is the appearance of that panel, Exhibit 28, typical of a panel which has not been phosphate coated prior to painting and which has been through this salt spray test which you described? A. Yes, it is.

Exhibit 29 was processed in one of our phosphate processing solutions. It was given no pre-treatment prior to processing.

After being processed it was given this same draw which the other one was, painted with the same paint, given the same type of scratch, and put into the salt spray at the same time and for the same length of time.

Exhibit No. 30 was subjected to an alkali spray for one minute. It was a hot alkali. Then it was given a thorough water rinse. Then it was processed in a phosphate coating solution. Then this draw was placed in the panel. It was painted with the same paint. Then it was put in the
81 same salt spray for the same length of time.

Exhibit No. 31 was rolled four times through one of our small rubber wringer rolls, which were wet with water. It was then processed in the same phosphate solution, given the same draw, painted with the same paint, and subjected to the same salt spray test for the same length of time.

Q. 17. Was that given any alkali cleaning? A. No. This was not.

Q. 18. Now, does the appearance of any of these panels indicate the flaking off of the paint on some of them? If it does, indicate those and the ones that it does not, and explain the action of the salt spray on the paint. A. The salt spray has no effect on the paint itself directly, because this is the same paint here (indicating) that we have there (indicating). Of course, it had no effect.

Q. 19. That is Exhibit 31? A. Yes.

Q. 20. That is the same as which? A. Exhibit 28.

However, the salt spray does get underneath the paint, particularly where this paint has been scratched through. And where it gets underneath, it will tend to work the paint loose from the metal if the paint has poor adhesion. Also there may be definite corrosion occur on the metal which will force the paint away.

Then, after the test had progressed for a certain length of time—in this case it was 119 hours—all panels were rubbed with a sharp material, such as a knife; and the paint very readily peeled away from this Exhibit 28 panel.
82 Exhibits 29, 30 and 31 were subjected to exactly the same rubbing action with a knife.

In the case of Exhibit 29 much more paint adhered to the panel than in the case of Exhibit 28. In the case of Exhibit 30 there was not much difference between 30 and 29. In the case of Exhibit 31 very little paint peeled off. It was almost perfect at the end of the test.

Q. 21. What does that indicate, or does it indicate anything with respect to the character of the phosphate coating which is applied to those panels? A. Yes, it does. It indicates that when we have applied the phosphate coating over a panel which has been rolled, we have a type of coating there which is much better adherent to the panel. And when that panel is subjected to corrosive action, that corrosive action has much less effect on the metal and cannot force the paint off as it will whenever the same process is applied without rolling.

Q. 22. Will you state whether or not this salt spray test that you subjected these panels to here is a standard type of test that you use in your ordinary commercial work in testing your various coatings? A. Oh, yes. That is a standard test. We have thousands of panels in the test all the time.

Q. 23. And this paint that you used was a standard paint? A. Yes. It is a commercial paint.

Q. 24. You carried through all the processing of these panels that you have described? A. Yes, I did.

Q. 25. Exhibits 28 to 31? A. Yes.

83 Mr. Dickey: That is all.

I will offer the panels, Exhibits 28 to 31, to be introduced in evidence.

The Court: They may be admitted.

(Thereupon the panels, Plaintiffs' Exhibits 28 to 31, were received in evidence.)

Mr. Cochran: No questions.

(Thereupon the witness was excused and retired from the witness stand.)

Mr. Dickey: That is the plaintiffs' case.

Mr. Cochran: I want to offer in evidence the exhibit for the Patent Office which I handed up to your Honor yesterday. That exhibit consists of a copy of the Spear patent, No. 244,153; a copy of the Thomas patent, No. 1,360,819; a copy of the Saunders patent, No. 1,872,507; a copy of the Shonkwiler patent, No. 1,946,766; a copy of the Tanner patent, No. 2,067,214; a copy of the Allen, reissue patent, No. 17,484; a print of the drawings of the plaintiffs' application; a copy of the Examiner's statement; and a copy of the decision of the Board of Appeals.

Mr. Dickey: No objection for the plaintiffs.

Mr. Cochran: That is the defendant's only exhibit.

The Court: It will be admitted.

(Thereupon Defendant's Exhibit No. 1 was received in evidence.)

The Court: The defendant rests, I understand?

Mr. Cochran: Yes, your Honor.

The Court: I will be very glad to hear argument,
84 or I will take the case under advisement.

Mr. Dickey: I would be very glad to argue, if the Court please, or submit a brief or memorandum if the Court desires. I am entirely at the disposal of the Court in this connection.

The Court: I will take the case under advisement. I assume that I will have a copy of the transcript?

Mr. Dickey: We will have it made up.

Would you like to have a brief?

The Court: The practice has been to take the case under advisement immediately after the close of the evidence and not, so far as I am able to determine, to permit briefs to be filed. But I will be very glad, if counsel wish to submit any briefs which they think will be helpful to the Court, to accept them. In other words, I would like to have all the help and all the light that can be shed on both sides of this case.

Mr. Dickey: Would you care to have an argument also?

The Court: If you care to argue, I will be very glad to hear you. It is entirely up to counsel.

Mr. Dickey: I have had this experience with cases taken under advisement, and that is that the argument comes better after the briefs are submitted; that it is more helpful at that time than it is immediately after the evidence is closed, because of the interval that has elapsed between the closing of the evidence and the submission of the briefs before the argument comes to the Court's attention. But I will be perfectly willing to do anything—

The Court: That has not been the practice here. But if you submit your brief and decide to supplement that with an oral argument, that is perfectly all right. That has not been the practice, I know.

85 Mr. Cochran: We have not had that practice, but I would not object to it.

Mr. Dickey: Very well. I would be glad to do it that way.

The Court: You may do that after the brief is submitted.

Mr. Dickey: After the briefs are submitted we can arrange a time for argument.

The Court: Yes. That is perfectly all right.

Mr. Cochran: Will your Honor set the time for the filing of the briefs?

The Court: The briefs ought to be filed as conveniently as possible, because this matter is fresh in my mind, and I do not like to keep cases under advisement for a long period of time, because obviously you get into other cases, and the cases that are still under advisement sort of slip into the background a little bit. So, may I suggest that you file your briefs as promptly as you can.

I suppose that the stenographer will require a few days to get that transcript out. How about a week?

Mr. Dickey: That is all right.

The Court: How is that for the Patent Office?

Mr. Cochran: That will be satisfactory. I assume that I will have three or four days after the plaintiffs' brief is filed?

The Court: Yes. In other words, a week for the petitioner and a week for the Patent Office.

Mr. Dickey: Very well.

(Thereupon, at 11 o'clock a.m., an adjournment was taken sine die.)

May 29, 1942.

87 Endorsed: Filed May 6—1942 Charles E. Stewart, Clerk

In the District Court of the United States
For the District of Columbia

Civil Action No. 7741

JOHN S. THOMPSON and HAROLD J. MCVEY, *Plaintiffs,*

v.

CONWAY P. COE, Commissioner of Patents, *Defendant.*

Findings of Fact.

1. This is an action under Section 4915 R. S. (U. S. C., title 35, sec. 63) in which plaintiffs seek a judgment which would authorize the Commissioner of Patents to issue to them a patent containing claims 20 to 26, inclusive, of their application No. 138,868 which was filed in the Patent Office on April 26, 1937, and entitled "Method of Cleaning Metal."

2. The application and claims relate to a method of rust-proofing a metallic article by applying to it an aqueous solution of a rust-proofing compound. In the method water is first applied to the article and then the article while wet is passed between rolls in order to insure a complete wetting of the surface. Immediately thereafter the article is subjected to the aqueous solution of the rust-proofing compound.

3. The only means disclosed in plaintiffs' application, for effecting a complete wetting of the article, is a pair of rolls between which the article is passed. Claims 88 20, 21 and 25 define this means broadly as "mechanical means" for breaking down the surface tension of the

water. The remaining claims recite rolls. It was not established by the evidence either that the mere breaking down of the surface tension of the water on the surface of the article would result in a complete wetting of the surface, or that the rolls would actually operate to break down the surface tension of the water. Claims 20, 21 and 25 are broader than the alleged invention disclosed in plaintiffs' application and are therefore unpatentable.

4. The Saunders et al. patent, No. 1,872,507, of August 16, 1932, discloses a method and apparatus for rust-proofing metal bodies, in which the bodies are first sprayed with a washing solution containing an alkali, then sprayed with rinsing water, then sprayed with a rust-proofing solution and finally sprayed with a rinsing solution.

5. The Spear patent No. 244,153, of July 12, 1881, discloses a process and apparatus for galvanizing metal sheets in which the following operations are carried out:

(1) Iron sheets are pickled in the tank A in a bath of sulphuric acid.

(2) They are then placed in tank B, containing lime water, for the purpose of neutralizing the acid.

(3) They next enter tank C, which contains water, and in this tank they are scrubbed with brushes C'.

(4) They next pass between rubber rollers C^2, which remove excess water.

(5) They then enter tank D, containing a strong solution of zinc chloride. The purpose of this solution is to produce a surface on the sheet which will readily receive the final zinc coating.

89 (6) On leaving the tank D the sheets pass between dollars d' which remove the surplus solution adhering to the sheets.

(7) Next the sheets pass into the oven E, where they are dried.

(8) Finally, they pass through feeding rolls f into the tank F, which contains the molten zinc.

6. The Thomas patent, No. 1,360,819, of November 30, 1920, discloses a method of tinning plates. The plates are first passed through a pickling bath 7 and then drenched with water by jets coming from pipes 10 which are arranged between sets of rolls 9. Finally the plates are fed into the tin pot 11 by guide rolls 12.

7. The Shonkwiler et al. patent, No. 1,946,766, of February 13, 1934, discloses an apparatus and a method for etching a metal sheet to produce thereon a surface which will readily take and hold a coat of paint. The sheet coming off the roll C is first sprayed with alkali or water coming from the pipes 6 for the purpose of removing the oil which is usually found on the sheet. Next the sheet goes between the brushes 7 and wringer rolls 8 and then into the etching bath 10, which is composed of a solution of nitric acid.

8. The Tanner et al. patent, No. 2,067,214, of January 12, 1937, discloses the coating of a metal surface which is to be painted later. The coating, like that used by plaintiffs, is a phosphate or an oxide. After the coating is done the metal sheet is washed with a dilute solution of chromic acid, phosphoric acid, or oxalic acid.

9. The prior patents cited by defendant show that in the art of treating the surfaces of metal sheets it was common to pass the sheet, while wet, between rolls, and certain patents show that it was old to introduce the sheet into a water solution of the treating material immediately after
90 its passage between the rolls. This is exemplified in
the Spear patent which discloses the steps of passing the metal sheet while wet between the rubber rollers C^2 and immediately thereafter into the tank D containing a water solution of zinc chloride. Similarly in the Shonkwiler et al. patent the metal sheet while wet is passed between wringer rolls 8 and then immediately into an etching bath consisting of a water solution of nitric acid.

10. The advantage of having the metal sheet thoroughly wet when it enters the aqueous solution of rust-proofing material, or aqueous solution of other treating material, is that the aqueous solution will act uniformly and quickly on the whole surface of the sheet. This advantage is inherent in the methods disclosed in the Spear and Shonkwiler et al. patents. The use by plaintiffs of the same wetting procedure and same wetting means to attain the same advantage in a rust-proofing method did not require the exercise of invention.

11. The final rinsing of the article in a solution containing one of the group of chromic acid, phosphoric acid, oxalic acid, and mixtures thereof, recited in claim 26, is admitted by plaintiffs to be old and moreover is disclosed in the Tanner et al. patent. The recitation of this step imparts no patentability to this claim.

12. None of the claims here involved recites anything amounting to an invention over the prior art, and none of these claims is patentable.

91 *Conclusions of Law.*

1. Plaintiffs are not entitled to the issuance of a patent containing any of the claims set out in the complaint.

2. The complaint should be dismissed with costs against the plaintiffs.

MATTHEW F. McGUIRE
Justice.

92 Endorsed: Filed May 6—1942 Charles E. Stewart, Clerk

In the District Court of the United States
For the District of Columbia

Civil Action No. 7741

JOHN S. THOMPSON and HAROLD J. MCVEY, *Plaintiffs,*

v.

CONWAY P. COE, Commissioner of Patents, *Defendant.*

Judgment.

This cause having come on to be heard and having been tried in open Court and argued by counsel for the respective parties upon the pleadings and proofs adduced and submitted to the Court,

It is Adjudged this 6th day of May, 1942, that the complaint in this case be, and the same hereby is dismissed with costs against the plaintiffs.

MATTHEW F. McGUIRE
Justice.

Approved as to Form:

RICHARD P. SCHULTZE
Attorney for plaintiffs.

93 Endorsed: Filed May 28 1942 Charles E. Stewart, Clerk

In the District Court of the United States
For the District of Columbia

Civil Action No. 7741

JOHN S. THOMPSON and HAROLD J. McVEY, *Plaintiffs,*

v.

CONWAY P. COE, Commissioner of Patents, *Defendant.*

Notice of Appeal

Notice is hereby given that the plaintiffs John S. Thompson and Harold J. McVey appeal from the judgment entered May 6, 1942 to the U. S. Court of Appeals for the District of Columbia.

RICHARD P. SCHULZE
540 Shoreham Building
Washington, D. C.,
Attorney for Plaintiffs

Memorandum

MAY 28 1942
$250 cash deposited in lieu of bond on appeal.

94 Endorsed: Filed May 28 1942 Charles E. Stewart, Clerk.

In the District Court of the United States
For the District of Columbia

Civil Action No. 7741

JOHN S. THOMPSON and HAROLD J. McVEY, *Plaintiffs,*

v.

CONWAY P. COE, Commissioner of Patents, *Defendant.*

Stipulation as to Record

The parties hereto designate the parts of the record, proceedings and evidence to be included in the record on appeal as follows:

1. Complaint.

2. Answer.

3. Findings of Fact and Conclusions of Law.

4. Judgment.

5. Testimony of John S. Thompson, Harold J. McVey and Edwin W. Goodspeed.

6. Plaintiffs' Exhibit 1, being the file wrapper and contents of Thompson and McVey application Serial No. 138,868, filed April 26, 1937.

7. Defendant's citations as follows:

Spear patent	244,153
Thomas et al patent	1,360,819
Saunders et al patent	1,872,507
Shonkwiler et al patent	1,946,766
Tanner et al patent	2,067,214
Allen patent	Re. 17,484.

8. Notice of Appeal.

9. Memorandum of cost bond on appeal.

10. Stipulation as to Record.

95 The parties hereto further hereby designate the following physical exhibits to be included in the record on appeal and to be transmitted to the United States Court of Appeals for the District of Columbia as physical exhibits:

Plaintiffs' exhibits 1 to 31, inclusive, comprising specimen panels illustrating the use of the invention claimed in the application for patent.

Plaintiffs' exhibits 2A to 9A, inclusive, and 11A to 18A, inclusive, comprising photomicrographs of specimen panels.

JOHN S. THOMPSON and
HAROLD J. McVey, Plaintiffs
By RICHARD P. SCHULZE,
Attorney for Plaintiffs

RICHARD P. SCHULZE

CONWAY P. COE, Commissioner of
Patents, Defendant
By W. W. COCHRAN, Solicitor of
the Patent Office, *Attorney for*
Defendant

W. W. COCHRAN

86 Endorsed: Filed May 29 1942 Charles E. Stewart, Clerk

In the District Court of the United States
For the District of Columbia

Civil Action No. 7741

JOHN S. THOMPSON and HAROLD J. McVEY, *Plaintiffs,*

v.

CONWAY P. COE, Commissioner of Patents, *Defendant.*

Order

It is hereby ordered that the original of plaintiffs' Exhibit 1, including the patents cited by defendant, be sent to the United States Court of Appeals for the District of Columbia in lieu of copies.

JESSE C. ADKINS
Justice

District Court of the United States
For the District of Columbia

United States of America,
District of Columbia, ss:

I, Charles E. Stewart, Clerk of the District Court of the United States for the District of Columbia, hereby certify the foregoing pages numbered 1 to 6½, both inclusive, and 86 to 95, both inclusive, to be a true and correct transcript of the record, according to stipulation by counsel filed and made a part of this transcript, and the matter required by Rule 75(g) of the Federal Rules of Civil Procedure, in cause entitled John S. Thompson, et al., Plaintiffs vs. Conway P. Coe, Commissioner of Patents, Defendant, Civil Action No. 7741, as the same remains upon the files and of record in said Court.

A copy of the transcript of the shorthand report of the prooceedings, etc. filed herein, as to the accuracy of which counsel has certified, is tranmitted herewith and numbered pages 7 to 85, both inclusive; also transmitted herewith, pursuant to order of this Court, is the original of plaintiffs' Exhibit 1, including the patents cited by defendant. The physical exhibits herein designated are to be presented to the Court of Appeals by counsel on the hearing of this action.

In Testimony Whereof, I hereunto subscribe my name and affix the seal of said Court, at the City of Washington, in said District, this 30th day of June, 1942.

CHARLES E. STEWART,
(Seal) *Clerk.*
By CHAS. B. COFLIN,
Deputy Clerk.

IN THE UNITED STATES COURT OF APPEALS

FOR THE DISTRICT OF COLUMBIA

OCTOBER TERM, 1942

No. 8309

JOHN S. THOMPSON AND HAROLD J. McVEY,
Appellants,

v.

CONWAY P. COE, Commissioner of Patents.

Appeal from the District Court of the United States for the District of Columbia.

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97 Endorsed: Filed Nov 12 1942 Charles E. Stewart, Clerk

THOMPSON ET AL.

v.

COE, Commissioner of Patents

Exhibit in Civil Action 7741

Department of Commerce
United States Patent Office

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the records of this office of the File Wrapper and Contents, in the matter of the Pending Application of John S. Thompson and Harold J. McVey, Filed April 26, 1937, Serial Number 138,868, for Improvement in Method of Cleaning Metal.

In Testimony Whereof I have hereunto set my hand and caused the seal of the Patent Office to be affixed at the City of Washington, this tenth day of November, in the year of our Lord one thousand nine hundred and forty-two and of the Independence of the United States of America the one hundred and sixty-seventh.

CONWAY P. COE
(Seal) *Commissioner of Patents.*

Attest:
JOHN FLANS
Chief of Division.

NUMBER (Series of 1935) 138868

PATENT No.

1937

DATED 140.2-B

DIV. ~~2~~ 73 4797

(EX'R'S BOOK)

Name JOHN S. THOMPSON AND HAROLD J. MC VEY

of DETROIT

State of MICHIGAN

Invention METHOD OF CLEANING METAL

ORIGINAL	RENEWED
APPLICATION FILED COMPLETE APR 26, 1937	
Petition, Specification, Oath, First Fee $30, 1 sheets Drawings, APR 26, 1937	
Examined and passed for Issue ......, 193	Reexam'd and passed for Issue ......, 193
...... Exr. Div.	...... Exr. Div. ......
Notice of Allowance ......, 193 By Commissioner.	Notice of Allowance ......, 193 By Commissioner.
Final Fee ......, 193	Final Fee ......, 193

DATES OF APPLICATION FILED

Division of Appl. No. ......, filed ......, 19

Attorney MAXWELL V. WALLACE 6503 DU BOIS ST DETROIT MICH

Associate Attorney Harness, Dickey + Pierce,

address General Motors Bldg., Detroit, Michigan

No. of Claims Allowed ...... Print Claims ...... in O.G. Class ......

Title as allowed ......

APPLICATION FOR U. S. LETTERS PATENT
ALL RIGHTS RESERVED

Law Reporter Blank No. 601

APR-26-37 202803 K Check — 30.00

PETITION

138868

APR 26 1937

30 clak

To the Commissioner of Patents:

Your petitioners (1) John S. Thompson and Harold J. McVey

citizens of The United States of America

residing at 16475 Cherrylawn and 2325 E. Grand Blvd., respectively, Detroit

in the county of Wayne *and State of* Michigan

and whose post-office addresses are as above

pray that Letters Patent may be granted to them *for the improvement in* METHOD OF CLEANING METAL

set forth in the annexed Specification.

And they *hereby appoint (2)* Maxwell V. Wallace

of 6503 DuBois Street

Register No. 13095 *Attorney with full power of substitution and revocation, to prosecute this application, to make alterations and amendments therein, to sign* their *names to the drawings, to receive the Letters Patent, and to transact all business in the United States Patent Office connected therewith.*

Signed at Detroit*, in the County of* Wayne *and State of* Michigan *this* 22nd *day of* April*, 193*7

(Sign here First name in Full.) John S. Thompson

Harold J. McVey

(1) In case of assignment of the invention, application and oath must be made by actual inventor, even if patent issue to assignee.
(2) If the power of attorney be given to a firm, the full name of each member of firm must be given, or it will be ignored.

SPECIFICATION.

To All Whom it May Concern:

BE IT KNOWN, That John S. Thompson and Harold J. McVey

citizens of United States of America

residing at Detroit

in the County of Wayne *and State of* Michigan

have invented certain new and useful improvements in METHOD OF CLEANING METAL

of which the following is a specification:

100 This invention relates to the cleaning of metal and particularly metal that is to have its surface prepared to receive paint, dye, lacquer or the like. In the conversion of a metallic surface to a non-metallic one it is of fundamental importance that the metal surface be thoroughly cleaned before the conversion process is commenced, and this is especially true when the coating to be obtained is a phosphate. When an undesirable material is present on the surface of a sheet, or other object to be processed, it is found to produce a very spotty coating. It has been found that the above condition can be overcome by means of a plurality of rollers through which the work to be processed is passed before entering the phosphate solution, providing these rollers are fed with liquid, preferably a cleaning medium, to aid the scrubbing action of the rollers upon the metal about to be processed.

The principal object of the present invention is to provide a new and improved method of cleaning metal surfaces preparatory to converting the surface thereof from one of metal to one of non-metal, to provide a uniform and streak-free surface.

Another object of the present invention is to provide a new and improved method of rinsing metal articles following the conversion of their surfaces from metallic to non-metallic.

The above and other objects will appear more fully from the following more detailed description and from the drawings wherein:

Fig. 1 is a top plan view of the apparatus used in carrying out the present process; and

Fig. 2 is a side elevation taken substantially on the line 2-2 of Fig. 1.

Referring now to the drawings. The numeral 10 designates a processing tank of any desired shape or size, but as herein shown, is rectangular. Suitably located within the tank 10 are two pair of sprocket wheels, 11 having
101 trained thereon carrier chain 12, for a purpose later to be described. Chain 12 is guided through channel iron 13 located in the lower portion of tank 10, so

that the chain will not scrape the bottom of the tank and at all times keep the slack where needed, as shown best in Fig. 2 of the drawings.

A heating pipe 13a is conveniently located within the tank to supply heat for the processing solution 14. Superimposed above tank 10 at one end thereof is a bearing bracket 15 within which is located a pair of rollers 16 and 17. These rollers may comprise any resilient or semi-resilient material, such as cloth wound to a shaft, a plurality of buffing wheels juxtaposed upon a shaft or as herein shown, or may comprise rubber bonded to a small core or shaft. Roller 17 is the driving roller, driven by means of belt 18 but may be driven by a chain, gear or other means, from a source of power not shown, while roller 16 is the driven roller, rotated by friction. Handwheels 19 control an adjusting mechanism whereby driven roller 16 may be raised or lowered to permit the passage of various sizes of work 20 between the rollers, and also regulate the pressure of the rollers on the work. A conduit 21 is provided adjacent roller 16 to provide fluid for the roller when needed. As shown best in Fig. 1, conduit 21 has therein a plurality of holes so located that fluid impinges the roller 16 longitudinally thereof and as the roller rotates, the entire surface thereof will become moistened. As breaks occur in the feeding of the work 20 to the rollers 16, 17, fluid will find its way onto the driving roller 17, so that both rollers will be moist during the processing operation.

At the end of the processing tank 10 where the work leaves the solution there is provided a pair of rollers, 23 designating the driving roller, driven through belt 25 and pulley 26 and 24 the driven roller. These rollers are similar in construction to rollers 16, 17 and tend to guide the
work toward driving roller 27 driven by belt 28 and
102 pulley 29 and driven roller 30. These rollers guide
the work over the water rinse tank from which water, either hot or cold, is pumped to pipes 32, 33. These pipes have a plurality of holes therein and are located one above and one below the work transversely thereof and are provided with baffle plates 34 so that the spray from the pipes

32, 33 will directly impinge the work on both sides thereof to remove any excess solution remaining on the surface of the work. Driving roller 35 driven by belt 36 and pulley 37 is aligned directly below driven roller 38 to guide the work above the acid rinse tank 39 from which is pumped through perforated conduits 40, 41, acid rinse solution. Baffle plates 42 are so arranged angularly that they direct the spray against the top and bottom of the work to thoroughly remove any remaining excess solution that might cling to the work following the water rinsing operation. Numeral 44 designates a conduit used to carry a heating medium to keep the rinsing solution at the desired temperature. To guide the work from the acid rinsing tank 39, there is provided driving roller 45 driven by belt 46 and pulley 47 and a driven roller 48 in vertical alignment therewith.

The manner in which the process operates is as follows:

As a specific example, the operator would add 27 pounds manganese dihydrogen phosphate to 100 gallons of water or 27 pounds of zinc dihydrogen phosphate to 100 gallons of water, if it is desired to have formed a phosphate rustproof coating on the metal to be processed.

The addition of certain oxidizing agents to the above solutions such as sulphites, sulphurous acid, nitrates, nitrites, chlorates and certain metallic accelerators, such as copper, iron, etc. may be added to the above solutions to bring about coatings in a much shorter time. Ferrous di-
hydrogen phosphates may also be used in conjunc-
103 tion with one of the above mentioned phosphates, but
in this case an oxidizing agent should be selected
that does not oxidize iron to any great extent.

If an oxalate coating is desired, 40 lbs. of oxalic acid and 8 pounds of sodium nitrate may be added to 100 gallons of water or 40 pounds of oxalic acid and 8 pounds of ferric oxalate may be added to 100 gallons of water.

If an oxide coating is desired 4.5 pounds sodium chlorate and 8.0 pounds of 96% H_2SO_4 may be added to 100 gallons of water.

The solution desired is placed in processing tank 10 and steam is run through heating pipe 13a and when the solution has reached a temperature between 110° and 210°F., conveying chain 12 may be operated, the same moving in a counter-clockwise direction about sprocket wheels 11. The upper run of the chain 12 is slacked to form a cradle so that the article being processed is fully submerged during part of its travel through the processing tank. Handwheels 19 are then turned to raise or lower driven roller 16 sufficiently to accommodate the article to be processed, and to regulate the pressure thereon. Driving roller 17 is then rotated by means of belt 18 and cleaning fluid is fed to conduit 21, which, being perforated, allows the fluid to fall upon roller 16, wetting the same and in turn drops upon roller 17 so that both rollers 16 and 17 are damp during the entire processing period.

The articles to be processed, as shown in Fig. 2 of the drawings, being sheet metal sheets, are fed between the rollers 16 and 17 and inasmuch as the rollers are wet, and their peripheral surfaces sufficiently close, both the top and bottom suface of the article being processed is subjected to a scrubbing and wiping action, which thoroughly removes all foreign matter such as scale or surface corrosion 104 and at the same time breaks the surface tension sufficiently to enable the processing solution to quickly convert the surface of the article being treated from a metallic one to a non-metallic one. The wetting solution may be water, either hot or cold. The solution may be pumped directly from the processing tank or any one of the well known cleaning solutions may be used. After the article has been thoroughly cleaned by passing it between the wet rollers, it is supported upon the concaved portion of conveyor chain 12, which portion is at all times beneath the surface of the solution in tank 10. After passing through processing solution 14, the work 20 is passed between rollers 23 and 24, driving roller 23 advancing the work until it engages driving roller 27 and is passed between rollers 27, 30, located above rinsing tank 31. Rinse tank 31 contains water, either hot or cold, from where it is pumped into spray pipes 32, 33, located above and below the work. Baffle plates 34 direct the flow of fluid against the work so

that it impinges the same direct and is again returned to tank 31 to be used again. This rinsing operation removes any excess processing solution that may remain on the surface of the work. Driving roller 35 and driven roller 38 move the work over acid rinse tank 39, heated by means of steam pipe 44, located above and below the work and the work is impinged by this rinse solution in the same manner just described for the water rinse. The rinse solution contains a dilute solution of chromic acid, phosphoric acid, oxalic acid or a salt of iron, chromium or aluminum may be used, such as aluminum nitrate or sulphate, ferrous sulphate, ferric nitrate and chromic sulphate or nitrate. By the use of a final rinse, subsequent paint blistering is reduced to a minimum. The solution may be used from 150° to 180° F. From 7 to 21 ounces of the acid or salt per 100 gallons of water is the preferred strength from the standpoint of economy, although stronger solutions are
105 just as effective. A treatment of one minute in these solutions is sufficient. Driving roller 45, together with driven roller 48 further advances the finished product completely out of the processing apparatus.

There has been disclosed above a new and improved process for the cleaning of articles about to have their surfaces converted from metallic to non-metallic. The continuous wetting of the wiping rollers to remove undesirable surface material from the article to be processed produces superior uniform coatings. The process is economical to operate, water being sufficient as the wetting agent. The invention is not limited to the wetting of articles to be processed in a phosphate, oxalate or oxide solution, but may be successfully applied whenever the surface of the article to be processed is converted from a metallic coating to a non-metallic one.

106 We claim:

1. The method of cleaning metal preparatory to converting the surface of the metal from a metallic surface to a non-metallic surface which consists in passing the metal between a plurality of rollers while the rollers are moist.

2. The method of cleaning metal preparatory to placing thereon a phosphate coating which consists of passing the metal between a plurality of rollers while the rollers are moist.

3. The method of cleaning metal preparatory to placing thereon an oxalate coating which consists of passing the metal between a plurality of rollers while the rollers are moist.

4. The method of cleaning metal preparatory to placing thereon an oxide coating which consists of passing the metal between a plurality of rollers while the rollers are moist.

5. The method of cleaning metal preparatory to converting the surface of the metal from a metallic surface to a non-metallic surface which consists of passing the metal between a plurality of rubber rolls while said rollers are moist.

6. The method of cleaning metal preparatory to converting the surface of the metal from a metallic surface to a non-metallic surface which consists of passing the metal between a plurality of rubber rolls while said rolls are being moistened with a metal cleaning compound.

7. The method of cleaning metal preparatory to converting the surface of the metal from a metallic surface to a non-metallic surface which consists of passing the metal between a plurality of cloth rolls while said rollers are moist.

107 8. The method of cleaning metal preparatory to converting the surface of the metal from a metallic surface to a non-metallic surface which consists in passing the metal between a plurality of moist rollers, through a water rinse and thereafter subjecting the metal to a final rinse in a solution containing one of the group of chromic acid, phosphoric acid, or oxalic acid, or a salt of iron, chromium or aluminum.

9. The method of cleaning metal preparatory to converting the surface of the metal from a metallic to a non-metallic surface which consists of passing the metal between a plurality of moist rollers composed of resilient or semi-resilient material.

In Testimony Whereof we affix our signature.

John S. Thompson
(Sign here, First name in full.)

Harold J. McVey

OATH

State of Michigan
County of Wayne } ss.:

John S. Thompson and Harold J. McVey

the above-named petitioners, being duly sworn, depose and say that they are *citizens of (1)* United States of America *and residents of* Detroit, Michigan

that they *verily believe* themselves *to be the original, first, and (2)* original *inventors of the improvement in* METHOD OF CLEANING METAL

ie Oath
2/5

described and claimed in the annexed specifications; that they do *not know and do not believe that the same was ever known or used before* their *invention or discovery thereof, or patented or described in any printed publication in any country before* their *invention or discovery thereof, or more than two years prior to this application, or in public use or on sale in the United States for more than two years prior to this application; that said invention has not been patented in any country foreign to the United States on an application filed by* them *or* their *legal representatives or assigns more than twelve months prior to this application; and that no application for patent on said improvement has been filed by* them *or* their *representatives or assigns in any country foreign to the United States, except as follows: (3)*

(Sign here First name in Full.) John S. Thompson

Harold J. McVey

Sworn *to and subscribed before me this* 22nd *day of* April *193*7

Marguerite G. Coe
(Official Signature.)

[Seal here, to be impressed in paper.]

Notary
(Official Character.)

My Commission Expires Oct. 2, 1938

NOTE.—Acknowledgment should be made before a Notary Public, *who must affix his seal.* If executed before an officer not provided with a seal, the Certificate of the Judge or Clerk of County Court must be affixed, showing official character of such officer.

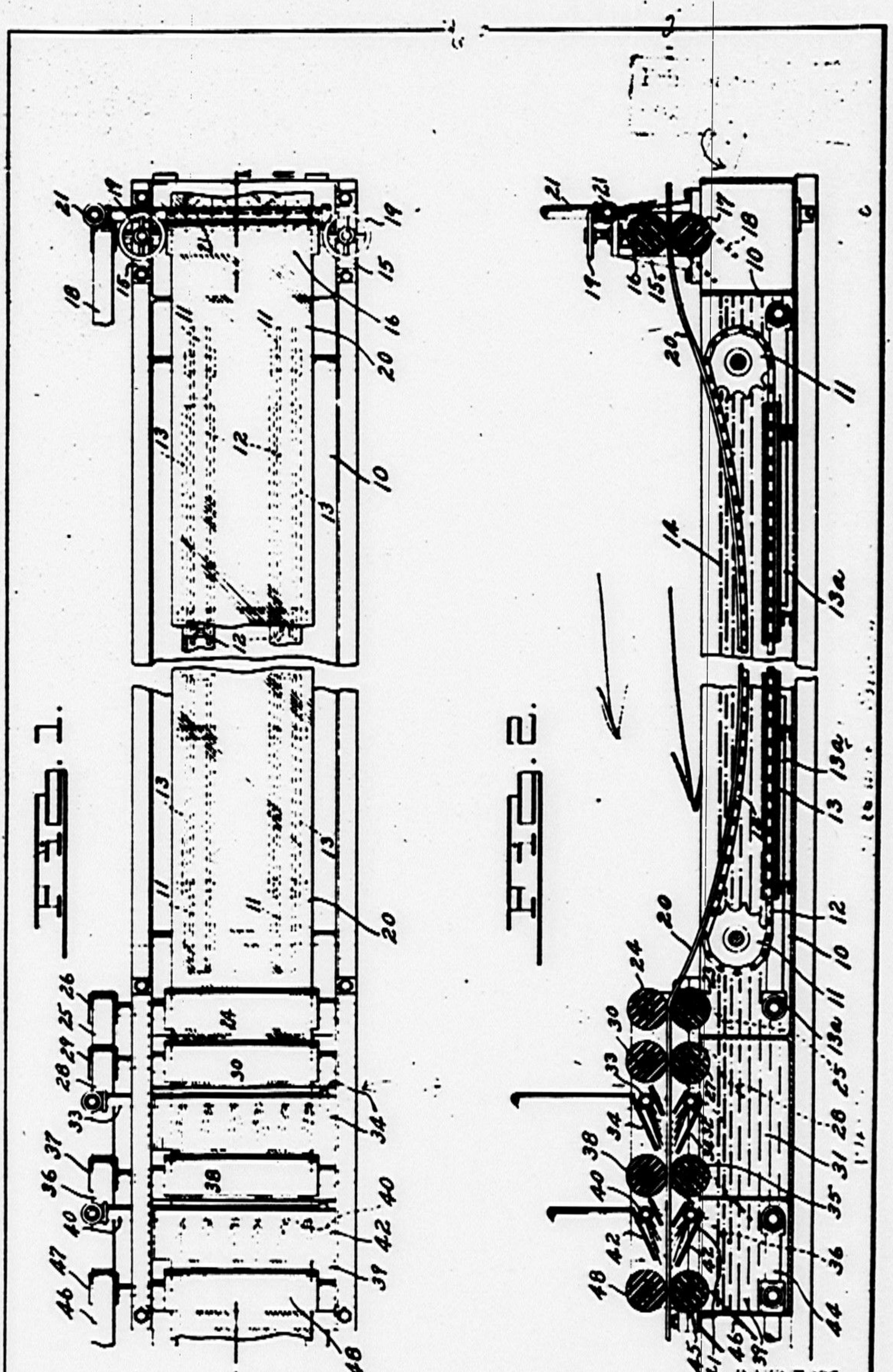
---

(1) If the applicant be an alien, the oath must show of what foreign or sovereign State he is a citizen or subject.

(2) "Joint" or "Sole."

(3) If any application for foreign patent has been filed twelve months prior to this application, applicant will be required before issuance of patent to show that no patent has been granted on application so filed.

138863



INVENTORS
JOHN S THOMPSON
HAROLD J McVEY

BY

ATTORNEY.

110 Endorsed: Mailed Jun 3—1937

Div. 27 Room 5708 Paper No. 3

Department of Commerce
United States aPtent Office
Washington

Applicant: John S. Thompson et al.
Ser. No. 138,868
Filed Apr. 26, 1937
For Method of Cleaning Metal

Maxwell V. Wallace,
6503 Du Bois St.,
Detroit, Mich.

References made of record:

Buckman,	451,263,	Apr. 28, 1891,	15-77x
Harvey,	Re. 2,116,	Nov. 28, 1865,	15-102x
Schutte,	1,963,063,	June 19, 1934,	15-77
Zimmerman,	1,865,417,	June 28, 1932,	15-102
Cowles,	617,720,	Jan. 17, 1899,	15-102
Wakeley,	352,986,	Nov. 23, 1886,	15-102
Saunders et al.,	1,872,507,	Aug. 16, 1932,	91-44 (6.5 Ux)
Allen,	Re.17,484,	Nov. 12, 1929,	148-6.5

Claims 1 to 4 and 9 are rejected as fully met by any of the first six mentioned patents which show metal cleaning apparatus which includes resilient rollers kept moist by sprays.

Claim 5 is rejected in the same manner since any of the patents to Buckman, Harvey or Schutte show rubber rolls.

Claim 7 is rejected in the same manner since any of the patents to Zimmerman, Cowles or Wakeley disclose a plurality of cloth rolls.

Claim 6 is rejected as not patentable over any of Harvey, Buckman, Wakeley or Schutte since these use water in a manner that justifies its broad definition as a metal cleaning compound.

111 Claim 8 is rejected as not patentable over Cowles in view of Saunders et al., since no invention is seen in providing the Cowles machine spray pipe located at 20, with a Parkerizing solution such as those mentioned in this claim since Saunders et al. shows that it is old to spray a Parkerizing solution through a nozzle on to the job. Allen further discloses a device which rubs the metal to further the chemical action.

Claim 8 is rejected as not patentable over Zimmerman in view of Saunders et al. in the same manner as the previous rejection since no invention is seen in applying the Parkerizing solution through the pipe 22 of Zimmerman as suggested by Saunders et al.

Claim 8 is further rejected as not patentable over the combination of Saunders et al. and Cowles, that is, there would be no invention in first cleaning the metal by passing it through the rolls 4, 5, 6 and 7 of Cowles which are moistened by spray pipes 18 and 20, and then passing the metal through the Saunders device which would give it a water rinse and finally a Parkerized finish.

All claims are rejected as indefinite since they all include improper apparatus limitations to method
112 claims thus obscuring the original intent; that is, it is impossible to tell from the claims whether the method or the apparatus is the alleged invention.

The word "semi-resilient" in the last claim is objected to since it is thought that —slightly resilient— is meant and this condition is included in the term "resilient".

All claims are rejected.

A new oath is required since the fact that the applicants are the joint inventors has been omitted from the present oath (as per Rule 46 Patent Office Rules of Practice).

Cole/T

WM. W. CLARK,
Examiner.

* * * * * * * * * *

4
Oath

MAIL DIVISION
DEC 2 1937
U.S. PATENT OFFICE

In Testimony Whereof we affix our signatures.

John S. Thompson
(Sign here, First name in full.)
Harold J. McVey

OATH

State of Michigan
County of Wayne } ss.:

John S. Thompson and Harold J. McVey

the above-named petitioners, being duly sworn, depose and say that they are citizens of (1) United States of America and residents of Detroit, Michigan

that they verily believe themselves to be the original, first, and (2) joint inventors of the improvement in "METHOD OF CLEANING METAL"

described and claimed in [illegible] U. S. Application Serial No. 138,868 filed April 26, 1937 that they do not know and do not believe that the same was ever known or used before their invention or discovery thereof, or patented or described in any printed publication in any country before their invention or discovery thereof, or more than two years prior to this application, or in public use or on sale in the United States for more than two years prior to this application; that said invention has not been patented in any country foreign to the United States on an application filed by them or their legal representatives or assigns more than twelve months prior to this application; and that no application for patent on said improvement has been filed by them or their representatives or assigns in any country foreign to the United States, except as follows: (3)

(Sign here First name in Full.) John S. Thompson
Harold J. McVey

Sworn to and subscribed before me this 29 day of November 1937

[illegible]
(Official Signature.)

[Seal here, to be impressed in paper.]

Notary [illegible]
(Official Character.)

My [illegible] Oct 14-1941

NOTE.—Acknowledgment should be made before a Notary Public, *who must affix his seal.* If executed before an officer not provided with a seal, the Certificate of the Judge or Clerk of County Court must be affixed, showing official character of such officer.

(1) If the applicant be an alien, the oath must show of what foreign or sovereign State he is a citizen or subject.
(2) "Joint" or "Sole."
(3) If any application for foreign patent has been filed twelve months prior to this application, applicant will be required before issuance of patent to show that no patent has been granted on application so filed.

114 Endorsed: Mail Division Dec 2 1937 U. S. Patent Office

Endorsed: U. S. Patent Office Dec 3 1937 Division 27

In the United States Patent Office

Div. 27, Room 5708
Serial No. 138,868
Filed: April 26, 1937
John S. Thompson, et al

Method of Cleaning Metal

Amendment

November 30, 1937

Hon. Commissioner of Patents,
Washington, D. C.

Sir:

In response to Official Action dated June 3, 1937, the above identified application is hereby amended as follows: Cancel claims 1 to 9 inclusive and substitute therefor the following:

10. In preparing the surface of metal for a subsequent chemical reaction to convert the surface thereof from one of metal to one of non-metal, characterized by the step of passing the metal through a plurality of moist rolls to provide a pressure scrubbing action in advance of said converting step.

11. In preparing the surface of metal for a subsequent chemical reaction to convert the surface thereof from one of metal to one of phosphate, characterized by the step of passing the metal through a plurality of rolls to provide a pressure scrubbing action in advance of said converting step.

115 12. In preparing the surface of metal for a subsequent chemical reaction to convert the surface thereof from one of metal to one of oxalate, characterized by the step of passing the metal through a plurality of rolls

to provide a pressure scrubbing action in advance of said converting step.

13. In preparing the surface of metal for a subsequent chemical reaction to convert the surface thereof from one of metal to one of oxide, characterized by the step of passing the metal through a plurality of rolls to provide a pressure scrubbing action in advance of said converting step.

14. In preparing the surface of metal for a subsequent chemical reaction to convert the surface thereof from one of metal to one of non-metal, characterized by the step of passing the metal through a plurality of moist rubber rolls to provide a pressure scrubbing action in advance of said converting step.

15. In preparing the surface of metal for a subsequent chemical reaction to convert the surface thereof from one of metal to one of non-metal, characterized by the step of wetting the surface of the metal while simultaneously subjecting the surface of said metal to a scrubbing action.

16. In preparing the surface of metal for a subsequent chemical reaction to convert the surface thereof from one of metal to one of non-metal, characterized by the step of passing the metal through a plurality of moist cloth rolls to provide a pressure scrubbing action in advance of said converting step.

116 17. In preparing the surface of metal for a subsequent chemical reaction to convert the surface thereof from one of metal to one of non-metal, characterized by the step of passing the metal through a plurality of moist rolls to provide a scrubbing action in advance of said converting step, and thereafter subjecting the metal to a final rinse in a solution containing one of the group consisting of chromic acid, phosphoric acid, oxalic acid or a salt of iron, chromium or aluminum and mixtures thereof.

18. In preparing the surface of metal for a subsequent chemical reaction to convert the surface thereof from one of metal to one of non-metal, characterized by the step of passing the metal through a plurality of moist rolls composed of resilient material.

Add the following new claim:

19. In preparing the surface of metal for a subsequent chemical reaction to convert the surface thereof from one of metal to one of non-metal, characterized by the consecutive steps of passing the metal through a plurality of moist rolls in advance of said converting step and immediately submerging the metal in a chemical reaction solution followed by a rinsing operation as the metal leaves the reaction solution.

Remarks

Claims 1 to 9 inclusive have been cancelled and have been rewritten as claims 10 to 18 inclusive to overcome Examiner's objection that these claims as originally presented were indefinite since they included apparatus limitations to method claims. These claims have been redrawn to now conform to former Assistant Commissioner Clay's decision in Ex Parte Jepson, found in 243 O. G. 525, C. D. 1917, page 62. The Commissioner not only held that claims such 117 as those now presented for consideration, are entirely proper, but highly commended claims of such type as being of a form which "makes it unnecessary to analyze the claim in order to find out what is the life and essence of the invention".

In rejecting the claims the Examiner has cited a number of metal cleaning apparatus patents, none of which either separately or when grouped, show a method of cleaning metal surfaces prior to converting the surface thereof from metal to one of non-metal.

Reconsideration of Examiner's rejection of claims 1 to 4, now numbered 10, 11, 12 and 13 and claim 9, now numbered 18 as fully met by the patents to Buchman, Harvey, Schutte, Zimmerman, Cowles and Wakeley, is respectfully requested. It is admitted that the above enumerated patents disclose apparatus for cleaning metal, but none of them disclose a pressure scrubbing and cleaning operation to break the surface tension of the metallic surface prior to converting the surface thereof from one of metal to one of salt. As the work 20 is passed between the moist rollers, there is no difference in speed between the peripheral speed of the rolls and the linear speed of the work and this produces a pressure scrubbing action. This pressure scrubbing action prepares the metal to react with the converting solution and produces results much superior to those produced without the cleaning and pressure scrubbing action of the moist rollers. In view of the above and the present form of these claims, the same are thought to be allowable.

Reconsideration of Examiner's rejection of claim 5 now numbered 14 on the patents to Buchman, Harvey and Schutte is respectfully requested. Although the above patents disclose rubber rolls for removing liquid or for cleaning prior to coating with tin or an alloy thereof, none of these reference disclose rubber rollers for use in cleaning and pressure scrubbing metal prior to converting the surface thereof from one of metal to one of non-metal. The pressure scrubbing action of the rubber on the metal
118 surface tends to prepare the metal to react with the
corrosion retarding solution. In its present form this claim is now thought to be allowable over the references so far cited.

Reconsideration of Examiner's rejection of claim 7, now numbered 16, on the patents to Zimmerman, Cowles and Wakeley, is respectfully requested. It is admitted the above patents disclose apparatus having cloth covered rolls therein for cleaning metal, but none of these references disclose this type of cleaning as a step in a rust proofing process in which the surface tension is broken prior to converting the metallic surface to one of non-metal. In its present form the claim is thought to be allowable over the references cited.

Reconsideration of Examiner's rejection of claim 6, now numbered 15, on the patents to Harvey, Buchman, Wakeley and Schutte, is respectfully requested. In applicant's process the water is used to keep the rolls moist at all times during the processing of the metal. The dampened rolls tend to more efficiently overcome surface tension which prevent the corrosion retarding solution from quickly converting the surface. The process as set forth in the instant application must be taken in its entirety, i. e., not only the use of a moistening material such as water, but the steps of passing the metal through moistened scrubbing rolls to clean and prepare them for converting the surface of the metal from one of metal to one of non-metal. The claim in its present form is thought to be allowable over the references cited.

Reconsideration of Examiner’s rejection of claim 8, now numbered 17, on the patents to Cowles in view of Saunders, Allen, Cowles and Zimmerman is respectfully requested. In applicant’s process a “Parkerizing” solution is not sprayed through a pipe onto the work. The process is one of immersion after the work has been thoroughly scrubbed and cleaned by means of the damp rolls. The Saunders patent
recites in its opening statement that in “Parkeriz-
119 ing” or “Bonderizing” it has been customary to
submerge the bodies in tanks or baths of enormous
capacity. The present invention is an improvement over the old immersion process it having been discovered that superior coatings are produced by first pressure scrubbing the surface of the metal to be processed by passing it through moist resilient rolls followed by the submerging of the article in the corrosion retarding solution followed by a water and acid rinse. Allen discloses means for pickling at boiling temperature and removing scale while the rust-proofing operation is in progress. Applicants’ remove deleterious matter prior to the work entering the solution at room temperature by passing the work through moist rolls which have the same peripheral speed as the linear speed of the work. The Zimmerman reference sets forth a method of wet cleaning tin-plate after the tinning or coating operation has been completed in order to remove excess oil carried on the surfaces of the plates. The solution for rust-proofing in applicants’ disclosure is not

sprayed onto the work, but remains at all times in the processing tank, the only spraying being the water onto the rolls to keep them moist so that when the work is passed between them there is a friction or pressure scrubbing action which breaks the surface tension and at the same time remove dirt and other deleterious matter found on the surface of metal coming from the mill.

Cowles sets forth a machine for scouring or cleaning copper plates preparatory to the tinning thereof. The cleaning rolls are rotated at a much more rapid speed than the feed rolls and the water is used merely to carry away the dirt taken from the work. Saunders shows a means of dumping a rust-proof solution through a number of pinched nozzles by means of gravity much as a person would dump a fluid onto an object from a barrel or container located above the object to be coated. Actual use the past few months in a large steel mill has proved conclusively
120 that there is a marked advantage in the process set forth in the instant application, namely, the passing of the work through moist rollers traveling at the same speed as the work followed by the submerging of the work in the corrosion retarding solution, followed by a water and acid rinse. In its present amended form, this claim is thought to be allowable over the references so far of record.

New claim 19 has been added to set forth that the steps are consecutive and that the invention must be taken as a whole. The operator would not pass the sheets through the moist rolls and then wait a day or two before submerging them in the chemical converting solution because corrosion would again set in before the conversion of the surface from one of metal to one of non-metal had taken place. The process in its entirety comprises the cleaning of the metal prior to the surface conversion and the final rinse after the metal has passed through the processing solution. None of the references so far of record disclose a continuous cleaning and corrosion retarding process such as set forth in the instant application and the claim in its present form is thought to be allowable.

A new Oath is enclosed setting forth that applicants are joint inventors.

Respectfully submitted,

JOHN S. THOMPSON
HAROLD J. McVEY

By MAXWELL V. WALLACE
Attorney for Applicants

Nov. 30, 1937.

121 Endorsed: Mailed Jan 19 1938

Div. 27 Room 5708 Paper No. 6

Department of Commerce

United States Patent Office

Washington

Applicant: John S. Thompson et al.
Ser. No. 138,868

Filed Apr. 26, 1937
For Method of Cleaning Metal

Maxwell V. Wallace
6503 Du Bois St.
Detroit, Mich.

Responsive to amendment filed December 2, 1937.
Additional references made of record:

Spear	244,153	July 12, 1881	266-7x
Thomas et al.	1,360,819	Nov. 30, 1920	266-7
Shonkwiler et al.	1,946,766	Feb. 13, 1934	148-8x
Saunders et al.	1,872,507	Aug. 16, 1932	148-6.5ux
Thompson et al.	2,067,216	Jan. 12, 1937	148-6
Tanner et al.	2,067,214	Jan. 12, 1937	148-6.5x

Claims 10 to 19 are rejected as unpatentable method claims due to the improper apparatus limitation of a roll being included in the claim. (See Ex parte Foreman—1924 C. D. 47 and in re Fessenden 1916 C. D. 172.)

Claims 10 to 17 are rejected as inaccurate since, as there is no relative motion of applicant's rollers with respect to the work, it is not seen how any scrubbing action could occur.

Claim 17 is rejected as being drawn in an alternative form (Ex parte Markush 1925 C. D. 126.) and is further rejected since the substances described are not seen to constitute a true generic group as no relation is seen between the first three substances and the second three substances. The term "and mixtures thereof" in the last line of claim 17 is wholly indefinite.

122 These claims do not appear to be Ex parte Jepson claims, as it is still not clear whether the claims are for a cleaning step, or the combination of same with a parkerizing process, and are accordingly rejected as indefinite.

The claims are further rejected as not patentable over Saunders in view of any of Thomas et al., Shonkwiler et al., or Spear since as the former reference sets out the combination of a cleaning step preceding a parkerizing step, no invention is seen in providing a pair of moist rolls to perform the cleaning function such as 9, 10 of Thomas et al., 6, 8 of Shonkwiler or C′, C of Spear.

All claims are rejected.

The patents to Thompson et al. and Tanner et al. are cited to show further the state of the art.

WM. W. CLARK
Examiner

Cole/D

123 Endorsed: Mail Division Jun 23 1938 U. S. Patent Office

Endorsed: U. S. Patent Office Jun 24 1938 Division 27

In the United States Patent Office

Method of Cleaning Metal

Div. 27, Room 5708
Serial No. 138,868
Filed April 26, 1937
John S. Thompson, et al

Amendment

Detroit, Michigan
June 22, 1938

Hon. Commissioner of Patents,
Washington, D. C.

Sir:

In answer to Official Action dated January 19, 1938, the above entitled application is hereby amended as follows:

Cancel claims 10 to 19 inclusive without prejudice.

Add the following new claims:

20. In the rust-proofing of metallic objects by subjecting the same to the action of an aqueous solution of rust-proofing material, the step of applying water to the object prior to immersion in the rust-proofing solution and breaking down the surface tension of the water by mechanical means to effect a complete wetting of the surface of the object immediately prior to the rust-proofing step whereby said solution will immediately attack the entire surface of the object with substantially equal intensity.

21. In the rust-proofing of metallic objects, the step of applying water to the surface of said object, breaking down the surface tension of water in contact with the surface of the object by mechanically operated means whereby to effect the complete wetting of the surface of the object, and

subjecting said object while its surface is completely wetted by said water to the action of an aqueous solution of rust-proofing compound.

124 22. In the rust-proofing of metallic objects by subjecting the mto the action of an aqueous solution of rust-proofing compound, and the employment of rolls in the preparation of the object for the rust-proofing step, the step of subjecting said object to a squeezing operation between said rolls in the presence of water whereby said rolls break down the surface tension of said water and completely wet the surface of the same for reception of the rust-proofing solution, C^1.

23. The use of rolls in the rust-proofing of metallic objects by the action of an aqueous solution of rust-proofing compound, the step of subjecting the object to a squeezing action between said rolls in the presence of water to effect a complete wetting of the surface of the object preliminary to the action of said rust-proofing compound thereon, C^2.

24. The use of rolls in the rust-proofing a metallic article by the action of an aqueous solution of rest-proofing compound, the steps of subjecting the article to a squeezing action between said rolls in the presence of water to effect a complete wetting of the surface of the article and immediately subjecting said wetted surface to the action of said solution.

25. In the rust-proofing of objects by subjecting the same to the action an an aqueous corrosion retarding fluid compound, the step preliminary to the subjecting of said object to said fluid compound comprising applying at least the water element of said compound to the surface of said object and effecting a wetting of said surface by said element by mechanical means whereby in the subsequent action of said compound on said object, said compound will immediately and uniformly affect the entire surface of said object.

125 26. In the rust-proofing of metallic objects by subjecting them to the action of an aqueous solution of rust-proofing compound and the employment of rolls in the preparation of the article for the rust-proofing step, the step of subjecting said article to a squeezing operation between said rolls in the presence of water whereby said rolls break down the surface tension of said water and completely wet the surface of the same, immediately subjecting the surface of said article to the effects of the rust-proofing solution to convert the surface of said article from one of metal to one of non-metal, and thereafter subjecting the metal article to a final rinse in a solution containing one of the group of chromic acid, prosphoric acid, oxalic acid and mixtures thereof.

Remarks

The claims formerly in the case have been cancelled and new claims 20 to 26 inclusive, have been added to more fully bring out the invention disclosed. New claim 26 in its present form is thought to contain a generic group and insofar as the term "and mixtures thereof" is concerned, patents have been allowed by the Office containing this phrase in a similar type claim, for example, see Patent No. 2,067,216 claim 1, line 12.

The Examiner undoubtedly recognizes that there is an essential difference between the purpose and effect of applicants' step in regard to the subsequent treatment than is either shown or suggested in any of the references of record. As far as any of the references of record are concerned, the preliminary steps are simply washing steps to remove foreign material, or rinsing steps to remove or neutralize acid picked up in the pickling operation, and in none of the references, outside of Saunders, would there by any advantage in providing the article with a wetted surface at the time it enters the bath of material which 126 it is ultimately desired to apply and in fact it would be a disadvantage. Saunders merely suggests a preliminary washing step, but it has the same disadvantage as pointed out in the present specification in which the present invention is specifically designed to overcome. As pointed out in the specification applicants have found that in order to obtain a uniform phosphate or other non-metallic coating on the article being treated, and to enable the process to be accomplished in the minimum period of time, it is essential that the surface of the article being treated be completely wetted. Reliance on immersion in the bath is found to be impractical to obtain this result as is also the mere application of water by spraying a hose or other application and that complete wetting can only be assured by mechanically breaking down the surface tension of the water in the preliminary wetting step. Thus the wetted surface of the article which is subjected to the rust-proofing material is wetted with one of the elements which comprises the rust-proofing solution and this assures complete and immediate action of the solution over the entire surface.

In view of the above remarks and the new claims now in the case it is thought the case in its present form is ready for allowance and a prompt allowance on the same is courteously solicited.

Respectfully submitted,

JOHN S. THOMPSON
HAROLD J. McVEY

By MAXWELL V. WALLACE.

Maxwell V. Wallace
503 DuBois Street,
Detroit, Michigan

127 Endorsed Sep 1 1938

Div. 3 Room 4093 Bu:EB Paper No. 8

Department of Commerce
United States Patent Office
Washington

Applicant: John S. Thompson
et al.
Ser. No. 138,868
Filed Apr. 26, 1937
For Method of Cleaning Metal.

Maxwell V. Wallace,
6503 DuBois St.,
Detroit, Mich.

In response to amendment filed June 23, 1938:

Claims 20, 21 and 25 are rejected as fully met in Saunders. Spraying with water under pressure, as shown by Saunders will mechanically break down the surface tension of the water.

Claims 22 to 24 and 26 are rejected, similarly to cancelled claims 10 to 19, as improperly including apparatus limitations in method claims.

Claims 22 to 24 and 26 are further rejected as lacking invention over Saunders in view of Allen. To use rolls to assist uniform wetting in Saunders instead of spraying the water under pressure would amount to an obvious substitution of equivalents and would involve no invention, particularly in view of Allen showing such use of rolls.

Claims 22 to 24 and 26 are further rejected similarly to canceled claims as unpatentable over Saunders in view of Thomas et al., Shonkwiler et al., or Spear for reasons of record.

Referring particularly to claim 26, the use of Saunders in conjunction with a subsequent rinse of chromic acid, etc., common after treatments such as contemplated by Saunders and illustrated in Tanner, would be obvious.

Claim 25 is further rejected as broader than the alleged invention with respect to the "element" and "compound" mentioned therein.

128 Claim 25 is also rejected on the ground that by failure earlier to present it applicant has lost the right to present it now in this application. See 19 J. P. O. S. 802 and the warning therein given.

All the claims are rejected.

A. LINDSEY
Examiner

129 Endorsed: Filed, Mail Division Feb 24 1939 U S Patent Office

Endorsed: Filed U S Patent Office Feb 28 1939 Division 3

Endorsed: Filed, U. S. Patent Office Feb 27 1939 Division 27

Amendment C

In the United States Patent Office.

Method of Coating Metal.

Serial No. 138,868,
Filed: April 26, 1937,
John S. Thompson, et al.

Amendment

Detroit, Michigan,
February 22, 1939.

Hon. Commissioner of Patents,

Washington, D. C.

Sir:

In answer to Official Action dated September 1, 1938, the above entitled application is hereby amended as follows:

Claim 20, line 4, after “solution and” cancel “mechanically.” Line 5, after “water” insert—by mechanical means—.

Claim 21, line 2, after “object” cancel “mechanically.” Line 4, after “object” insert—by mechanically operated means—.

Claim 22, line 4, cancel “article” beginning of line, and substitute therefor—object. Line 5, cancel “article” beginning of line, and substitute therefor—object—. Cancel the period, end of claim, and substitute therefor a comma and add—and then immediately subjecting said wetted surface to said aqueous solution of rust-proofing compound—.

Claim 23, line 3, after “subjecting the” cancel “article” and substitute therefor—object—. Line 5, after “surface of the” cancel “article” and substitute therefor—object—. Cancel the period, end of claim and substitute therefor a comma and add—and then subjecting said object to the action of said aqueous solution of rust-proofing compound while said surface remains completely wetted—.

Claim 24, line 1, after “rust-proofing” cancel “of” and substitute therefor—a—. Line 2 beginning of line, cancel “objects” and substitute therefor—article—.

Claim 25, line 2 after “action of” cancel “a” and substitute therefor—an aqueous—. Line 4, after “least”
cancel “one” and substitute therefor—the water—.
130 Line 5 after “object and” cancel “mechanically.”
Line 6, after “element” insert—by mechanical
means—. Line 7 after “uniformly” change “effect” to—affect—.

Claim 26, line 7 after “same” cancel “for the reception” and substitute therefor—, immediately subjecting the surface of said article to the effect—. Line 9 place a comma after “non-metal”, beginning of line.

Remarks:

Reconsideration of Examiner’s rejection of claims 20, 21 and 25, as amended, as being fully met in Saunders, is respectfully requested. The claims as amended now set forth the breaking down of the surface tension of the water “by mechanical means” or “mechanically operated means” and in their present amended form it is thought avoid Saunders who simply discloses a means for dumping rust-proofing solutions from a plurality of nozzles. Applicants apply the liquid by mechanical means as the work is passing between the opposed rollers.

Reconsideration of Examiner's rejection of claims 22, 23, 24 and 26 as improperly including apparatus limitations in method claims is respectfully requested. The United States Court of Appeals for the District of Columbia in Hartford Empire Co. v. Coe, 87 Fed (2d) 741, Decided April 9, 1936, stated:

“Method claims can be anticipated only by similar method, and cannot be anticipated by a piece of mechanism by which process might have been performed, or by earlier devices which require alteration to carry out such process, unless such use would have occurred to one whose duty it was to make practical use of mechanism described.”

Also in York Ice Machine Corporation v. L & K. Ice Corporation, 6 Pat. Supp. 545:

“A method is patentable even though it involves
131 mechanical steps.”

See also Ex parte A. M. Barrett and L. N. Udell, 26 U. S. P. Q., 150, and Ex parte Chester B. Sadtler, 28 U. S. P. Q. 141, both more or less recent decisions dealing with this subject.

Reconsideration of Examiner's rejection of claims 22, 23, 24 and 26 as lacking invention over Saunders in view of Allen is respectfully requested. Both of the cited references show and claim but one step, whereas the claims in question, as amended, call for two separate steps, namely the step of subjecting an object to a squeezing operation between a pair of opposed rollers in the presence of water, followed by the immediate subjection of the wetted object to an aquous rust-proofing solution. Saunders dumps the solution directly upon the object and Allen teaches a process for treating iron or steel articles with a rust-proofing compound and at the same time subjecting said article being treated to the scrubbing action of a plurality of rolls to prevent crystal growth upon the surface of the treated article.

Reconsideration of Examiner's rejection of claims 22, 23, 24 and 26 as unpatentable over Saunders in view of Thomas et al., Shonkwiler et al., or Spear, is respectfully requested. Saunders has been discussed above—teaching simply one step, that of dumping a solution upon an object. Thomas 1,360,819 sets forth a manufacture of tin and terne plates and other like metal coated plates or sheets consisting in immersing the plates or sheets separately in pickle so as to effect the chemical cleaning of the same, the plates or sheets being subsquently swilled, preparatory to their being tinned, branned and dusted. Shonkwiler et al., 1,946,766, teaches a process of producing ferrous sheet material by first hot rolling, then cold rolling, then finishing the process by the use of an etching material. Before the initial step the sheet is covered with oil and this oil is removed by use of a water solution containing alkali. Spear 244,153 teaches the use of an apparatus for galvanizing sheet iron in which he uses a water tank provided with a series of brushes arranged to rotate therein below the water level. The sheets are passed between brushes beneath the water level, a rubbing action being exerted upon each side of the sheet, to effect a removal of any accumulated deposit which
132 may have settled thereon in the rolling of the sheet.

It will be seen from the above that none of these references teach a two step process for wetting metallic sheets prior to a rust-proofing step.

Reconsideration of Examiner's rejection of claim 26 stating that the subsequent rinse use would be obvious, is respectfully requested. The principle is firmly established in Patent Law by a long line of decisions from the United States Supreme Court cases down, that a combination of old elements may be patentable even though every one of the elements of such combination may be separately old in the art.

"The mere fact that the various elements of a combination are old will not anticipate a claim to the combination. To find in the prior art each element in isolation is not to anticipate the work of an inventor who first evolves a new combination of those elements which by their conjoined functions produce a new result. It is indispensable that all of them, or their mechanical equivalents, be found in the same description, method, or device, where they have been combined in substantially the same way to produce substantially the same result as that accomplished by the combination of the invention."

The above quotation is taken from 48 Corpus Juris, page 31, which cites a multitude of decisions in support of the proposition, included among which decisions are the following cases of the United States Supreme Court:

Parks v Booth, 102 U. S. 96.
Imhaeuser v Buerk, 101 U. S. 647.
Hubbell v U. S. 179 U. S. 86.

It is thought that the amendment to claim 25 in regard to the "element" and "compound" mentioned therein removes Examiner's rejection on this ground, and that the claim in its present form removes Examiner's rejection as set forth in the last paragraph of the instant Office Action.

133 In view of the above remarks and the amendment to the claims now in the case, it is thought that the same is in condition for allowance, and allowance of the case is most courteously solicited.

Respectfully submitted,

JOHN S. THOMPSON.
HAROLD J. McVEY.

By: MAXWELL V. WALLACE,
Attorney.

134 Endorsed: Filed, Mailed Mar 31 1939

Div 3. Room 4093 Bu:EB Paper No. 10

Department of Commerce
United States Patent Office
Washington

Applicant: John S. Thompson et al.
Ser. No. 138,868
Filed Apr. 26, 1937
For Method of Cleaning Metal.

Maxwell V. Wallace,
6503 DuBois St.,
Detroit, Mich.

In response to amendment filed Feb. 24, 1939.

The rejection of claims 22 to 24 and 26 as lacking invention over Saunders in view of certain of the other references, respectively, has been carefully reconsidered in view of applicants' remarks, but is deemed sound and is accordingly repeated, for reasons of record which are deemed clearly to refute the arguments advanced, and claims 20, 21 and 25 are similarly rejected.

Since the claims as amended fail to avoid the previously presented grounds of rejection in any patentable respect, they are finally rejected, in accordance with Ex parte Jackson, 353 O.G. 5, and Ex parte Miller, 150 O.G. 827.

This is a final rejection of all the claims.

A. LINDSEY
Examiner.

135 Endorsed: Filed, Mail Division Sep 29 1939 U. S. Patent Office

Endorsed: Filed, Sep 29-39 060842 B 2 Check — U S Patent Office

Endorsed: Filed, U. S. Patent Office Oct 3 1939 Division 3

Endorsed: Filed, Board of Appeals Oct 2 1939 U. S. Patent Office

In the United States Patent Office

Method of Cleaning Metal

Div. 3, Room 4093,
Ser. No. 138,868,
Filed Apr. 26, 1937,
John S. Thompson et al

Appeal to the Board of Appeals

Hon. Commissioner of Patents
Washington, D. C.
Sir:

We appeal to the Board of Appeals from the decision of the Principal Examiner in the matter of the above-entitled application. The grounds of appeal are:

1. The Principal Examiner erred in rejecting the claims.
2. The Principal Examiner erred in rejecting the claims on the art of record.
3. The Principal Examiner erred as to matters of law.
4. The Principal Examiner erred as to matters of fact.

The appeal fee of $15.00 is filed herewith, and an oral hearing is respectfully requested.

JOHN S. THOMPSON
HAROLD J. McVEY

MAXWELL V. WALLACE,
Attorney

Maxwell V. Wallace
6503 DuBois Street
Detroit, Michigan

136 Endorsed: Filed Mailed Nov 2 1939

United States Patent Office

Before the Board of Appeals.

In re application
Thompson and McVey,
Serial No. 138,868,
Filed Apr. 26, 1937,
Method of Cleaning Metal.

Examiner's Statement

This is an appeal from the final rejection of claims 20 to 26 (all the claims now in the case).

The appealed claims are:

20. In the rust-proofing of metallic objects by subjecting the same to the action of an aqueous solution of rust-proofing material, the step of applying water to the object prior to immersion in the rust-proofing solution and breaking down the surface tension of the water by mechanical means to effect a complete wetting of the surface of the object immediately prior to the rust-proofing step whereby said solution will immediately attack the entire surface of the object with substantially equal intensity.

21. In the rust-proofing of metallic objects, the step of applying water to the surface of said object, breaking down the surface tension of water in contact with the surface of the object by mechanically operated means whereby to effect the complete wetting of the surface of the object, and subjecting said object while its surface is completely wetted by said water to the action of an aqueous solution of rust-proofing compound.

22. In the rust-proofing of metallic objects by subjecting them to the action of an aqueous solution of rust-proofing compound, and the employment of rolls in the preparation of the object for the rust-proofing step, the step of subjecting said object to a squeezing operation between said rolls in the presence of water whereby said rolls break down the

surface tension of said water and completely wet the surface of the same for reception of the rust-proofing solution, and then immediately subjecting said wetted surface to said aqueous solution of rust-proofing compound.

23. The use of rolls in the rust-proofing of metallic objects by the action of an aqueous solution of rust-proofing compound, the step of subjecting the object to a squeezing action between said rolls in the presence of water to effect a complete wetting of the surface of the object preliminary to the action of said rust-proofing compound thereon, and then subjecting said object to the action of said aqueous solution of rust-proofing compound while said surface remains completely wetted.

137 24. The use of rolls in the rust-proofing a metallic article by the action of an aqueous solution of rust-proofing compound, the steps of subjecting the article to a squeezing action between said rolls in the presence of water to effect a complete wetting of the surface of the article and immediately subjecting said wetted surface to the action of said solution.

25. In the rust-proofing of objects by subjecting the same to the action of an aqueous corrosion retarding fluid compound, the step preliminary to the subjecting of said object to said fluid compound comprising applying at least the water element of said compound to the surface of said object and effecting a wetting of said surface by said element by mechanical means whereby in the subsequent action of said compound on said object, said compound will immediately and uniformly affect the entire surface of said object.

26. In the rust-proofing of metallic objects by subjecting them to the action of an aqueous solution of rust-proofing compound and the employment of rolls in the preparation of the article for the rust-proofing step, the step of subjecting said article to a squeezing operation between said rolls in the presence of water whereby said rolls break down the surface tension of said water and completely wet the surface of the same, immediately subjecting the surface

of said article to the effects of the rust-proofing solution to convert the surface of said article from one of metal to one of non-metal, and thereafter subjecting the metal article to a final rinse in a solution containing one of the group of chromic acid, phosphoric acid, oxalic acid and mixtures thereof.

The following references are relied on in the rejection:

Saunders, et al.,	1,872,507	Aug. 16, 1932
Allen, Reissue	17,484	Nov. 12, 1929
Thomas, et al.	1,360,819	Nov. 30, 1920
Shonkwiler, et al.,	1,946,766	Feb. 13, 1934
Spear,	244,153	July 12, 1881
Tanner et al.,	2,067,214	Jan. 12, 1937

The Alleged Invention.

The alleged invention relates to the art of rust-proofing metal articles.

More particularly it relates to the art of treating metal articles with an equeous chemical solution which reacts therewith to form on their surfaces an adherent protective coating, having paint-bonding properties, and to the preliminary cleaning of articles in preparation for such chemical coating treatment.

138 To accomplish the preliminary cleaning, applicants subject the metal articles to a squeezing action between rolls in the presence of water so that the water may completely wet the metal surfaces and so that the subsequently applied rust proofing solution will wet and act on all parts of the surface.

After applying the rust-proofing solution applicants may subject the articles to a final rinse in a solution containing chromic, phosphoric or oxalic acid or a mixture thereof. The use of this final rinse is stated to minimize blistering in a paint coat subsequently applied.

The Rejection.

All the claims are rejected as lacking invention over Saunders, et al.

Saunders et al. disclose rust proofing metal articles by a process which includes spraying all portions of the surface thereof with the following solutions in the following continuous sequence:

(1) "a washing solution containing an alkali",

(2) "a rinsing liquid, such as water",

(3) an aqueous chemical rust-proofing solution "such as bonderizing and parkerizing solutions", which are the type of solutions preferred by applicants, although applicants do not specify their nature in the claims, and

(4) "a rinsing solution such as water."

The term "parkerizing", employed in Saunders, et al., is well understood in the art; for example the 1939 Metals Handbook, (Amer. Soc. for Metals, Cleveland) gives, on page 1121, the following definition:

> "The method called Parkerizing differs from Costlett's original method by adding an oxidizing agent and a catalyzer, usually manganese oxide (MnO), to the 1-2% solution of phosphoric acid which contains ferrous phosphate . . ."

It is clear from applicants' description that they prefer this same type of solution.

139 It will be apparent from the above that Saunders et al. fully meets each of claims 20, 21 and 25. Spraying with water under pressure of a considerable gravity head, as shown by Saunders et al. will mechanically break down the surface tension of the water.

Referring particularly to claims 22 to 24 and 26, it is considered that to use rolls to assist uniform wetting in Saunders et al. instead of spraying the water under pressure would amount to an obvious substitution of equivalents and would involve no invention, particularly in view of Allen showing such use of rolls.

Claims 22 to 24 and 26 are further rejected as not patentable over Saunders, et al., in view of any of Thomas, et al., Shonkwiler, et al., or Spear, since as the former reference sets out the combination of a cleaning step preceding a parkerizing step, no invention is seen in providing a pair of moist rolls to perform the cleaning function such as 9, 10 of Thomas, et al., 6, 8 of Shonkwiler et al., or C′, C of Spear.

Referring particularly to claim 26, it is noted that this claim recites rust-proofing with (broadly) an aqueous solution of a rust-proofing compound followed a final rinse in a solution containing one of the group of chromic acid, phosphoric acid, oxalic acid and mixtures thereof. While it seems extremely dubious that such a final rinse would be effective after treatment with all types of rust proofing aqueous solution, as assumed by this claim, there would be no invention in selecting such a rinse after the parkerizing of Saunders et al. in view of Tanner, et al. as illustrating the common practice of using a rinse of chromic acid, etc., after such phosphate coating treatments on metal article.

In view of the foregoing remarks, it is thought that the rejection is proper and should be sustained.

Respectfully,

A. LINDSEY
Examiner, Div. 3.

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140 201-a 32-855 Paper No. 13

Department of Commerce
United States Patent Office
Washington

Nov. 10, 1939

Sir:

The case of John S. Thompson and Harold J. McVey Serial No. 138,868, will be heard by the Board of Appeals on the 18th day of April, 1940.

The hearings will commence at 9.30 A. M. and as soon as the argument in one case is concluded the succeeding case will be taken up.

If any party, or his attorney, shall not appear when the case is called, his right to an oral hearing will be regarded as waived.

The time allowed for arguments is as follows:

Ex parte cases, thirty minutes;

Inter partes appeals: Interlocutory and final hearings when no testimony has been taken, thirty minutes each side; final hearing when testimony has been taken, one hour each side.

By special leave, obtained before the argument is commenced, the time may be extended.

The appellant shall have the right to open and conclude in inter partes cases, and in such cases a full and fair opening must be made.

Briefs in inter partes appeals must be filed in accordance with the provisions of Rules 144 and 163, as amended.

Respectfully,

CONWAY P. COE
Commissioner of Patents.

To Mr. Maxwell V. Wallace,
6503 Du Bois St.,
Detroit, Mich.

141 Endorsed: Board of Appeals Apr 18 1940 U. S. Patent Office

Endorsed: Mail Division Apr 17 1940 U. S. Patent Office

In the United States Patent Office

Before the Board of Appeals

In re application of
John S. Thompson et al
Serial No. 138,868
Filed April 26, 1937
For Method of Cleaning Metal

This is an appeal from the rejection of claims 20 to 26.

The appealed claims are:

20. In the rust-proofing of metallic objects by subjecting the same to the action of an aqueous solution of rust-proofing material, the step of applying water to the object prior to immersion in the rust-proofing solution and breaking down the surface tension of the water by mechanical means to effect a complete wetting of the surface of the object immediately prior to the rust-proofing step whereby said solution will immediately attack the entire surface of the object with substantially equal intensity.

21. In the rust-proofing of metallic objects, the step of applying water to the surface of said object, breaking down the surface tension of water in contact with the surface of the object by mechanically operated means whereby to effect the complete wetting of the surface of the object, and subjecting said object while its surface is completely wetted by said water to the action of an aqueous solution of rust-proofing compound.

22. In the rust-proofing of metallic objects by subjecting them to the action of an aqueous solution of rust-proofing compound, and the employment of rolls in the preparation of the object for the rust-proofing step, the step of subjecting said object to a squeezing operation between said rolls in the presence of water whereby said rolls break down the surface tension of said water and completely wet the surface of the same for reception of the rust-proofing solution, and then immediately subjecting said wetted surface to said aqueous solution of rust-proofing compound.

142 23. The use of rolls in the rust-proofing of metallic objects by the action of an aqueous solution of rust-proofing compound, the step of subjecting the object to a squeezing action between said rolls in the presence of water to effect a complete wetting of the surface of the object preliminary to the action of said rust-proofing compound

therein, and then subjecting said object to the action of said aqueous solution of rust-proofing compound while said surface remains completely wetted.

24. The use of rolls in the rust-proofing a metallic article by the action of an aqueous solution of rust-proofing compound, the steps of subjecting the article to a squeezing action between said rolls in the presence of water to effect a complete wetting of the surface of the article and immediately subjecting said wetted surface to the action of said solution.

25. In the rust-proofing of objects by subjecting the same to the action of an aqueous corrosion retarding fluid compound, the step preliminary to the subjecting of said object to said fluid compound comprising applying at least the water element of said compound to the surface of said object and effecting a wetting of said surface by said element by mechanical means whereby in the subsequent action of said compound on said object, said compound will immediately and uniformly affect the entire surface of said object.

26. In the rust-proofing of metallic objects by subjecting them to the action of an aqueous solution of rust-proofing compound and the employment of rolls in the preparation of the article for the rust-proofing step, the step of subjecting said article to a squeezing operation between said rolls in the presence of water whereby said rolls break down the surface tension of said water and completely wet the surface of the same, immediately subjecting the surface of said article to the effects of the rust-proofing solution to convert the surface of said article from one of metal to one of non-metal, and thereafter subjecting the metal article to a final rinse in a solution containing one of the group of chromic acid, phosphoric acid, oxalic acid and mixtures thereof.

The following references are relied on in the rejection:

Saunders et al	1,872,507	Aug. 16, 1932
Allen, Reissue	17,484	Nov. 12, 1929
Thomas et al	1,360,819	Nov. 30, 1920
Shonkwiler et al	1,946,766	Feb. 13, 1934
Spear	244,153	July 12, 1881
Tanner et al	2,067,214	Jan. 12, 1937

143 The invention relates to a treatment by which prompt and uniform reaction is obtained between the surface of metal and a rust-proofing solution such as an oxalate or phosphate solution. The treatment resides specifically in the use of wetted elastic rollers contacting the surfaces to be treated prior to introducing them in the treating solution.

It is well known that rust-proofing solutions, such as phosphate and oxalate solutions which will form a chemical coating upon the surface of metal, do not wet the surface of the metal as promptly or completely as a pickling solution, for example, which has more vigorous attack upon the surface of the metal. Since the production of coating depends upon reaction of the solution with the metal, and since for commercial purposes only a brief treatment by the solution is feasible, it is quite important that the solution attack the entire surface of the metal promptly and uniformly.

Various cleaning treatments have been employed for many years in an endeavor to present the metal surface in a uniformly clean condition to the action of the rust-proofing solution, but cleaning by such means as usually employed does not seem to leave the surface in a sufficiently uniform condition to prevent somewhat streaked results in commercial practice with rapidly operating rust-proofing solutions.

The action of the rolls accomplishes the purpose of a prompt and uniform attack of the subsequently applied solution. In describing the action, the applicants state, bottom of page 4 and top of page 5, that the rollers "break the surface tension sufficiently to enable the processing solution to quickly convert the surface of the article being treated from a metallic one to a non-metallic one." This is an attempt to describe the action of the rolls which is not thoroughly understood, but the results of which action are very clearly apparent.

144 The rejection of claims 20, 21 and 25 is based upon Saunders et al alone. In the Saunders et al patent, there is a disclosure of apparatus in which the surfaces to be treated are subjected to the usual washing and rinsing operation in a typical spray washing machine and thereafter the surfaces are treated with a rust-proofing solution. Claims 20, 21 and 25 each require "breaking down the surface tension of water by mechanical means to effect a complete wetting of the surface", "breaking down the surface tension of water in contact with the surface of the object by mechanically operated means", and "effecting a wetting of said surface by said element by mechanical means". Apparently the Examiner is taking the water spray of Saunders to be mechanical means. It is believed that this is clearly incorrect and that the claims clearly distinguish from the Saunders patent. Certainly, the effect of the mechanical pressure of the film of water onto the surface produces a result which the spraying of Saunders does not produce, and it is believed that the rejection of these claims upon the Saunders reference is clearly erroneous.

While it does not appear to be necessary to the allowance of the claims in this case, it may be pointed out that Saunders' device was not satisfactory. Evidence to that effect has been presented to the Examiner, showing that the assignee of that patent did not use it, and that a device made in accordance with the patent failed to produce uniform coatings. The Board has previously considered this matter in connection with the application of Darsey, Serial No. 15,251, filed April 8, 1935, in connection with which application they reversed the Examiner on January 25, 1939, where the reference relied upon was Saunders.

145 As previously indicated, these facts do not appear to be necessary to demonstrate that the claims are allowable in this case, but they emphasize the fact that Saunders et al not only differs from the claims in actual terms, but in results obtained.

Claims 22, 24 and 26 each specify the use of rolls with water to break down the surface tension or complete the wetting, etc. The Examiner holds these claims to be unpatentable over Saunders et al in view of Allen or in view of three other patents. On page 4, line 10 of the Examiner's Statement, he states that the use of rolls to assist the wetting of Saunders et al would involve no invention, "particularly in view of Allen showing such use of rolls." This statement by the Examiner is believed to be misleading. In Allen, pads 5, not rolls, are employed between plates to stir up the quiescent layer of solution next to the surface of the metal. This treatment does not take place before the sheets are dipped into the solution, but while they are in the solution, and nothing whatever is said in the patent upon the use of this method for wetting the plates. The pads in question are merely stirrers, and it is not apparent how there is anything in this patent which would suggest the use of rollers under any circumstances since none are shown in the patent.

Taking up the other patents in the order in which they are mentioned in the Examiner's Statement, Thomas shows a spraying device 10 arranged to spray a sheet of metal on its way to a tin pot 11. The Examiner does not allege that molten tin is analogous to an aqueous solution of phosphate or oxalate . There is no statement in the patent as to
146 what purpose rolls 9 may have if it is any other purpose than that of rolls 12 which are indicated to be used for feeding the sheet forward. Admittedly, sheet metal has been fed between rollers before.

The Examiner refers to parts 6 and 8 of Shonkwiler et al. The members 6 of Shonkwiler et al spray the surface of the sheet metal with alkali or water and "wringer rolls 8-8 of soft rubber for removing excess moisture'' are then employed. (See page 2, lines 28 to 32.) In the same patent, wringer rolls 14-14 are employed also.

The parts C′, C of Spear comprise a tank of water in which there ''are placed a series of revolving brushes C′ preferably formed of rubber sections divided radially so as to present toothed or serrated peripheries''. (See page 1, lines 58 to 61.)

What the references show is that there have been employed washing apparatus in which there were toothed rubber brushes employed as in Spear; that rolls have been used to feed metal sheets from one place to another, and that rubber wringer rollers have been used to remove excess moisture from sheets. Applicants are willing to admit in addition that rubber wringer rolls have been employed quite extensively for removing excess moisture from clothes. Nothing in any of these uses appears to suggest any advantage in employing such resilient rolls or equivalent mechanical means for preparing the surface of metal for wetting by a rustproofing solution, or that rolls would aid in obtaining uniform action of the solution upon the surface of the metal. Allen, who stirs up the coating solution to remove the quiescent layer adjacent the surface of the work, certainly has no bearing upon pretreatment of the surface of the metal before it is subjected to the action of the
147 solution. Saunders, the chief reference relied upon by the Examiner, shows the usual washing process which relies upon chemical means for cleaning and is the precise art over which applicants' improvement was made.

The Examiner had rejected claims 20 to 26, and in the opening of his statement indicates that the appeal is from the rejection of all of these claims, but in his application of the references to the claims, he does not mention claim 23. However, the remarks above relating to claims 22, 24 and 26 seem to apply fully as forcefully to claim 23 which requires squeezing action between rolls to effect a complete wetting of the surface of the object preliminary to the action of the rust-proofing solution.

Inasmuch as the references cited by the Examiner show no mechanical means whatever for cleaning the surface of metal prior to treatment in a rust-proofing solution, and since the use of rolls merely for conveying metal or as wringer rolls to dry metal does not suggest the use of rolls for wetting metal, it is believed that the Examiner has failed to cite any anticipation whatever for the improvement which applicants have made in the art to which their application relates. No discussion of the Tanner patent is necessary because the precise nature of the solution is not the feature upon which applicants rely to distinguish from the prior art other than, as indicated above, that the rust-proofing solutions to which this application relates are very different in nature from a molten tin solution or an acid pickle in that they are very much more sensitive to varying conditions of the surface of the metal.

It is believed clear that claim 23, to which the Examiner has not attempted to apply the references, as well as the other claims discussed above are clearly allowable 148 over the references, and accordingly the Examiner's action should be reversed.

Respectfully submitted,

MAXWELL V. WALLACE
Attorney for Applicants.

April 16th, 1940.

149 Endorsed: Filed, U S Patent Office, Board of Appeals Apr 26 1940 Mailed

Appeal No. 32,855 VFM

Hearing:
April 18, 1940

In the United States Patent Office
Before the Board of Appeals

Ex parte John S. Thompson and Harold J. McVey

Application for Patent filed April 26, 1937, Serial No. 138,868. Method of Cleaning Metal.

Mr. Maxwell V. Wallace for applicants.

This is an appeal from the final rejection of all claims remaining in the application, namely, 20 to 26.

Claims 20, 22 and 23 are illustrative.

20. In the rust-proofing of metallic objects by subjecting the same to the action of an aqueous solution of rust-proofing material, the step of applying water to the object prior to immersion in the rust-proofing solution and breaking down the surface tension of the water by mechanical means to effect a complete wetting of the surface of the object immediately prior to the rust-proofing step whereby said solution will immediately attack the entire surface of the object with substantially equal intensity.

22. In the rust-proofing of metallic objects by subjecting them to the action of an aqueous solution of rust-proofing compound, and the employment of rolls in the preparation of the object for the rust-proofing step, the step of subjecting said object to a squeezing operation between said rolls in the presence of water whereby said rolls break down the surface tension of said water and completely wet the surface of the same for reception of the rust-proofing solution, and then immediately subjecting said wetted surface to said aqueous solution of rust-proofing compound.

150 23. The use of rolls in the rust-proofing of metallic

objects by the action of an aqueous solution of rust-proofing compound, the step of subjecting the object to a squeezing action between said rolls in the presence of water to effect a complete wetting of the surface of the object preliminary to the action of said rust-proofing compound thereon, and then subjecting said object to the action of said aqueous solution of rust-proofing compound while said surface remains completely wetted.

The references relied upon by the examiner are as follows:

Spear	244,153	Jul. 12, 1881
Thomas et al	1,360,819	Nov. 30, 1920
Allen	Re. 17,484	Nov. 12, 1929
Saunders et al	1,872,507	Aug. 16, 1932
Shonkwiler et al	1,946,766	Feb. 13, 1934
Tanner et al	2,067,214	Jan. 12, 1937

The claims on appeal relate to apparatus and method used in connection with rust-proofing of metallic objects. In order to thoroughly wet the surface of the metal objects before they are immersed in an aqueous solution of rust-proofing material, they are subjected to water in the presence of means that will cause rubbing, scrubbing or simple direct squeezing effect. This is said to probably break down surface tension in the water and cause thorough contact.

All of the claims have been rejected in one instance as not patentable over Saunders et al. Saunders et al relate to the specific art of rust-proofing metal objects. Saunders et al project water against the surface in the same relative position or stage as applicants, namely, before subjecting the rust-proofing solution. Saunders et al employ water jets without rubbing or squeezing elements. The examiner holds that claims 20, 21 and 25, referring to employment of mechanical means or mechanically operated means, are
fully met by Saunders et al on the ground that
151 Saunders et al's jets will mechanically break down
the surface tension of the water.

It is urged on behalf of applicants that a mere water jet or spray is not mechanical means and further, that the language selected was an attempt to describe the action of "rolls" and that "rolls" produced an action not thoroughly understood but giving distinctly different results.

On consideration of applicants' original disclosure, it appears emphasized that rubbing, scrubbing, wiping and pressure effect were regarded as necessary to satisfy applicants' method. In view of the disclosure, it is believed that Saunders et al alone fail to satisfy the terms of the claims requiring the presence of mechanical means other than means for merely supplying water, but while this is true, we are not convinced from the record that it may not be assumed that Saunders et al would apply the water with such force as to mechanically break up surface tension and accomplish thorough wetting of the surface. We must, therefore, agree with the examiner's conclusions that claims 20, 21 and 25 fail to clearly present invention over the disclosure of Saunders et al on the ground of being equivalent.

Claims 22, 23, 24 and 26 include the term "squeezing action" or "operation" in referring to this step of wetting the surface.

Again on consideration of the specification it appears that the action described as being desirable was rather of a scrubbing, buffing, wiping nature than a mere squeezing
operation. In fact, the term "squeezing" is not
152 noted in the specification. In view of this seemingly
non-critical nature of squeezing in distinction to rubbing, we must agree with the examiner's conclusion that invention is not involved in the claims of this group over Saunders et al supplemented by Allen, Spear, Thomas et al, or Shonkwiler et al. Each of these citations, except perhaps Thomas et al, discloses rubbing or buffing effect produced on the surface of sheet metal in the presence of water obviously with the result of producing better contact promptly by mechanically breaking down surface tension. Spear particularly employs rubber fin rolls or brushes. In

view of the record, we are unable to find any particular critical effect or new result following the application of a true squeezing operation, if applicants are considered warranted in such limitation over the action disclosed by Spear or Shonkwiler et al as substituted for the simple jets of Saunders et al. No mechanical difficulty or we believe any new or unobvious result is thought to apply in merely substituting or adding rubbing or rolling effect for or to the water jets of Saunders et al.

The decision of the examiner is affirmed.

EUGENE LANDERS
Examiner-in-Chief

W. L. REDROW,
Examiner-in-Chief

W. L. THURBER
Examiner-in-Chief

Board of Appeals

April 26, 1940
Mr. Maxwell V. Wallace,
6503 Du Bois St.,
Detroit, Mich.

153 Endorsed: Filed, Mail Division Jul 12 1940 U. S. Patent Office

Endorsed: Filed, U S Patent Office Jul 13 1940 Division 27

Endorsed: Filed, U. S. Patent Office Jul 15 1940 Div 3

In the United States Patent Office

Associate Power of Attorney

John S. Thompson, et al.
Serial No. 138,868
Filed April 26, 1937

For Method of Cleaning Metal

Hon. Commissioner of Patents
Washington, D. C.

Sir:

Please recognize the firm of Harness, Dickey & Pierce, a firm composed of J. King Harness, Arthur W. Dickey, Hodgson S. Pierce, Wm. Edward Hann, Paul F. Seibold, Thomas J. Nienhaus, Cyrus G. Minkler, John D. Scofield, John A. Blair and John C. Sterrett, registry number 12637, whose postal address is General Motors Building, Detroit, Michigan, as my associate attorneys in the above entitled application, and address all future communications to them.

Respectfully,

MAXWELL V. WALLACE,
Attorney for Applicant.

6503 Du Bois Street
Detroit, Michigan
Dated:

Department of Commerce
United States Patent Office
Washington

Ex parte John S. Thompson
and
Harold J. McVey,

Serial No. 138,868,
Filed April 26, 1937,

Method of Cleaning Metal.

Notice of Civil Action Under Section 4915 R. S.

A civil action under Section 4915 R. S., entitled John G. Thompson and Harold G. McVey v. Conway P. Coe, Commissioner of Patents, Civil Action No. 7741, involving this application, was filed on July 23, 1940, in the District Court of the United States for the District of Columbia.

M. W. COCHRAN,
Solicitor.

July 23, 1940.

1937

CONTENTS

1. Application papers
2. Print Apr. 27, 1937
3. Rej JUN 8 - 1937
4. [illegible] Dec. 2, 1937
5. Amdt A Dec. 2, 1937
6. Rej JAN 19 1938
7. Amdt B June 23, 1938
8. [illegible] SEP 1 1938
9. Amendment C Feb 24 1939
10. Final Rej. MAR 31 1939
11. appeal Sept. 29, 1939
12. Examiner's Statement - NOV - 2 1939
13. Hearing April 18, 1940
14. Brief Apr. 17, 1940
15. ✓ DECISION BY BOARD APR 26 1940
16. assoc p of atty July 12, 1940
17. Notice of Civil Action under Sec. 4915 R.S. July 20 1940.
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21. Action,
22. abandoned,
23. [illegible]
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U. S. GOVERNMENT PRINTING OFFICE

U. S. Patent Office MAY 3 1937

156 Endorsed: Filed, Nov 19 1942 Charles E. Stewart, Clerk

In the District Court of the United States
for the District of Columbia

Civil Action No. 7741

John S. Thompson and Harold J. McVey, *Plaintiffs,*

v.

Conway P. Coe, Commissioner of Patents, *Defendant.*

Order

It is hereby ordered that the certified copy of the file wrapper and contents of the Thompson and McVey application, Serial No. 138,868, now on file in this cause, be included in and made a part of the record of this case before the Court of Appeals and that the said certified copy be forwarded to the Clerk of the Court of Appeals.

Matthew F. McGuire,
Justice.

November 19, 1942.

A True Copy, Test:

CHARLES E. STEWART,
Clerk,

By SOPHIE LYMAN
Deputy Clerk.

(Seal)

157 District Court of the United States
for the District of Columbia

Civil Action No. 7741

JOHN S. THOMPSON and HAROLD J. McVEY, *Plaintiffs*,

v.

CONWAY P. COE, Commissioner of Patents, *Defendant*.

I, Charles E. Stewart, Clerk of the District Court of the United States for the District of Columbia, hereby certify the foregoing pages numbered 97 to 155, both inclusive, to be a certified copy of the file wrapper and contents of the Thompson and McVey application, Serial No. 138,868 in the case of John S. Thompson, et al, Plaintiffs v. Conway P. Coe, Commissioner of Patents, Defendant, Civil Action No. 7741, which certified copy said Court ordered forwarded to the Clerk of the Court of Appeals pursuant to Order dated November 19, 1942, a certified copy of which is included herein and page numbered 156, said copies to constitute a supplemental record for the United States Court of Appeals for the District of Columbia.

[SEAL] In Testimony Whereof, I hereunto subscribe my name and affix the seal of said Court, at the City of Washington, this 23rd day of November, 1942.

CHARLES E. STEWART, *Clerk*.

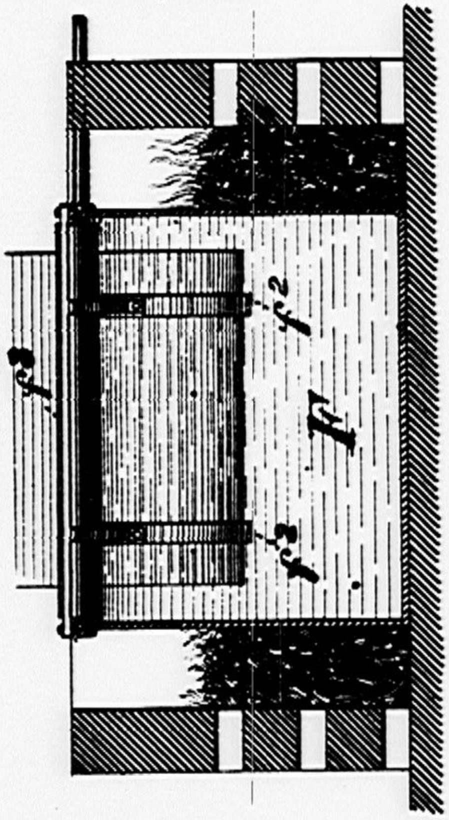
By: SOPHIE LYMAN,
Deputy Clerk.

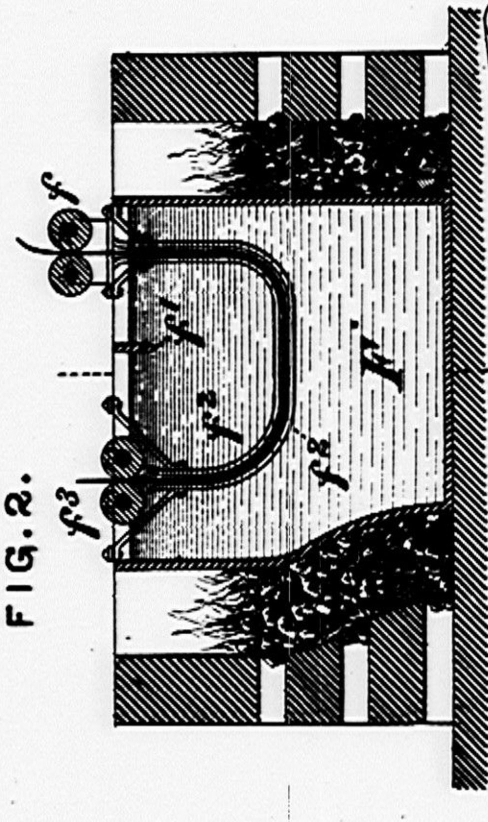
(No Model.)

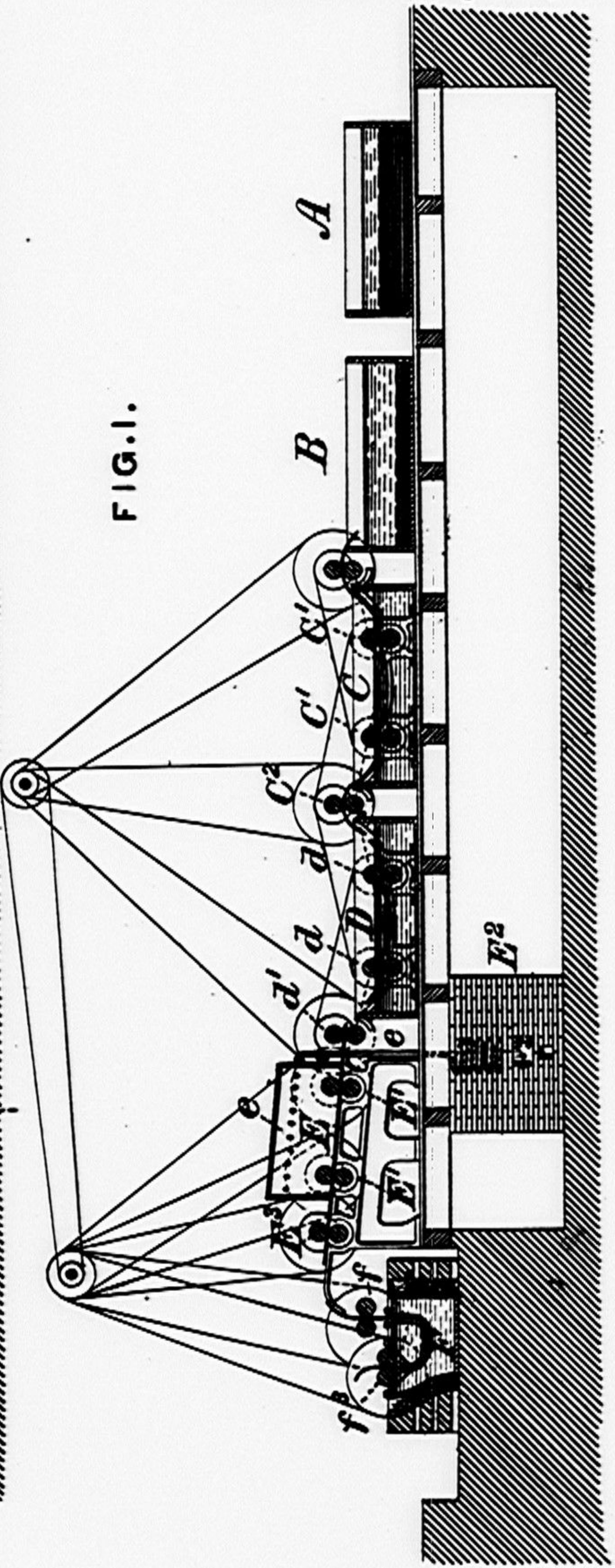
W. B. SPEAR.

MANUFACTURE OF GALVANIZED IRON.

No. 244,153. Patented July 12, 1881.







WITNESSES:

Wm H. Meyers

Geo. A. Vaillant.

INVENTOR

Wickham B. Spear,

by Collier & Bell,

ATTORNEYS.

UNITED STATES PATENT OFFICE.

WICKHAM B. SPEAR, OF PHILADELPHIA, PENNSYLVANIA.

MANUFACTURE OF GALVANIZED IRON.

SPECIFICATION forming part of Letters Patent No. 244,153, dated July 12, 1881.

Application filed May 10, 1880. (No model.)

To all whom it may concern:

Be it known that I, WICKHAM B. SPEAR, of the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in the Manufacture of Galvanized Iron, of which improvements the following is a specification.

The objects of my invention are to economize time, labor, and material in the manufacture of galvanized iron, and to produce a better and more highly finished product; to which ends my improvements consist in a novel apparatus, as hereinafter fully set forth.

To enable others skilled in the art to practice my invention, I describe the same with reference to the accompanying drawings, in which—

Figure 1 is a vertical longitudinal central section through an apparatus for galvanizing iron in accordance with my invention, and Figs. 2 and 3 are, respectively, vertical longitudinal vertical and transverse sections, each on an enlarged scale, through the zinc-tank.

A necessary preliminary to the practice of my invention, as to that of all other galvanizing processes with which in my experience as a manufacturer I have become familiar, is the removal of the scale or oxide from the sheets to be treated, which removal is ordinarily effected by immersion in a bath of sulphuric acid and water. As an alternative and preferable method of "pickling" the sheets, they may be placed in a tank containing a solution of sulphate of soda or potash, oil of vitriol, or commercial sulphuric acid and water, as I have found the surface of the iron to be in better condition after being cleaned by the use of such mixture than if a simple solution of sulphuric acid had been employed. After the sheets have been pickled they are removed from the bath and placed in a tank of water, from which they are removed, one at a time, and examined, and any particles of scale that may remain are removed by the use of a triangular scraper. Assuming either of the above methods to have been adopted, I take the sheets of iron which have been pickled in the vat A and immerse them in a tank or vat, B, of lime-water, for the purpose of neutralizing the action of the acid upon the iron, and preventing the corrosion or pitting of the latter thereby. In cases where the scale has been removed from the sheets by processes other than those involving the use of acid, as by abrasion or analogous means, the subsequent treatment with lime-water will be unnecessary, and is therefore dispensed with. I next pass the sheets to a tank, C, containing water, within which are placed a series of revolving brushes, C', preferably formed of rubber sections divided radially, so as to present toothed or serrated peripheries, between which brushes the sheet traverses below the surface of the water in the tank, the rubbing action of the brushes being exerted upon each side of the sheet, with the effect of removing therefrom any accumulated deposit which may have settled thereon in the rolling of the sheet, or in its immersion in the acid and lime-water baths, and providing a clean and perfect surface for the deposition of the zinc. The surplus water is removed from the sheets by passing them between gum rolls C^2 at the outlet or delivery end of the tank. The sheets are next passed from the rolls C^2 to a tank, D, and traversed, between carrying-rolls *d* therein, through a bath of a strong solution of chloride of zinc of, say, 30° to 36° specific gravity, the purpose of which is to prepare their surfaces for the reception of the zinc coating. A bath of dilute muriatic acid may, if preferred, be used in the tank D, in lieu of the solution of chloride of zinc. After passing through the tank D the surplus solution is removed from the sheets by passing them between gum rolls d', from which they pass to a drying-oven, E, which is composed of sheet-iron, and, by preference, heated by steam-pipes *e*, the sheets being traversed through the oven between iron carrying-rolls E'. The steam for heating the oven E may with advantage be superheated by means of a furnace, E^2, or by appliances connected with the boiler in which it is generated. The sheets are discharged from the drying-oven E, through rolls E^3, into a tank or vat, F, filled with zinc, which is maintained in a molten condition by the application of heat around the tank, the sheets entering the tank in a vertical direction, into which they are deflected by the feed and guide rolls *f*, and passing into the molten zinc through a stratum of chloride of zinc derived from a body of sal-ammoniac, which covers and floats upon the surface of the molten zinc, upon one side of a division-plate, f', extending across the vat F. The insertion and removal of the sheets vertically on opposite sides of the division-plate prevents the sal-ammoniac or resultant chloride of zinc from coming to the surface of the bath with the iron and staining the surfaces of the sheets, as is otherwise frequently the case. The use of sal-ammoniac or chloride of zinc in the tank F is not an essential; but I have found in practice its employment to be advantageous, and therefore recommend it. From the rolls f the sheets pass under the surface of the molten metal, being directed in their passage through the same by curved guides f^2, and are discharged from the tank in a finished condition by the delivery-rolls f^3.

By the employment of the feeding and delivery rolls and the curved guides the sheets may be passed, one by one, from the drying-oven directly to and through the zinc-tank, as rapidly as is consistent with the proper deposition of the zinc coating upon their surfaces.

The labor required for handling the sheets in the manner heretofore usually practiced is economized, and the delivery of the sheets from the zinc-bath between the rolls insures better finish and greater uniformity of coating than are obtainable when the sheets are inserted and removed by hooks or tongs, as is ordinarily the case.

The relative arrangement of the several vats or tanks and the drying-oven in one connected series is such that the several operations set forth can be consecutively and continuously performed, and the speed of the different pairs of rolls, between which the sheets pass in their traverse through the apparatus, should be substantially uniform, so that there may be no tendency to an undue accumulation of the sheets in one portion of the apparatus ~~or~~ delay thereof in another.

I claim as my invention and desire to secure by Letters Patent—

1. In an apparatus for galvanizing sheet-iron, a water-tank provided with a series of brushes arranged to rotate therein below the water-level, combined with an adjoining tank having a series of carrier-rollers rotating below the level of the liquid therein contained, and a pair of intermediate gum rollers located between the two tanks, or at the outlet or delivery end of the tank first named, substantially as set forth.

2. The combination, in an apparatus for galvanizing sheet-iron, of a water-tank provided with a series of brushes arranged to rotate therein below the water-level, a tank to receive a solution of chloride of zinc, and having a series of carrier-rolls adapted to rotate below the level of such solution, a drying-oven having internal carrier-rolls, and a tank for containing molten zinc, said tank being provided with guide feed-rolls and a curved guide for governing the direction of sheets of iron in passing through it, substantially as set forth.

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Witnesses:

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WM. H. MYERS.

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MANUFACTURE OF COATED PLATE AND APPARATUS THEREFOR.
APPLICATION FILED MAY 26, 1917.

1,360,819. **Patented Nov. 30, 1920.**

3 SHEETS—SHEET 1.

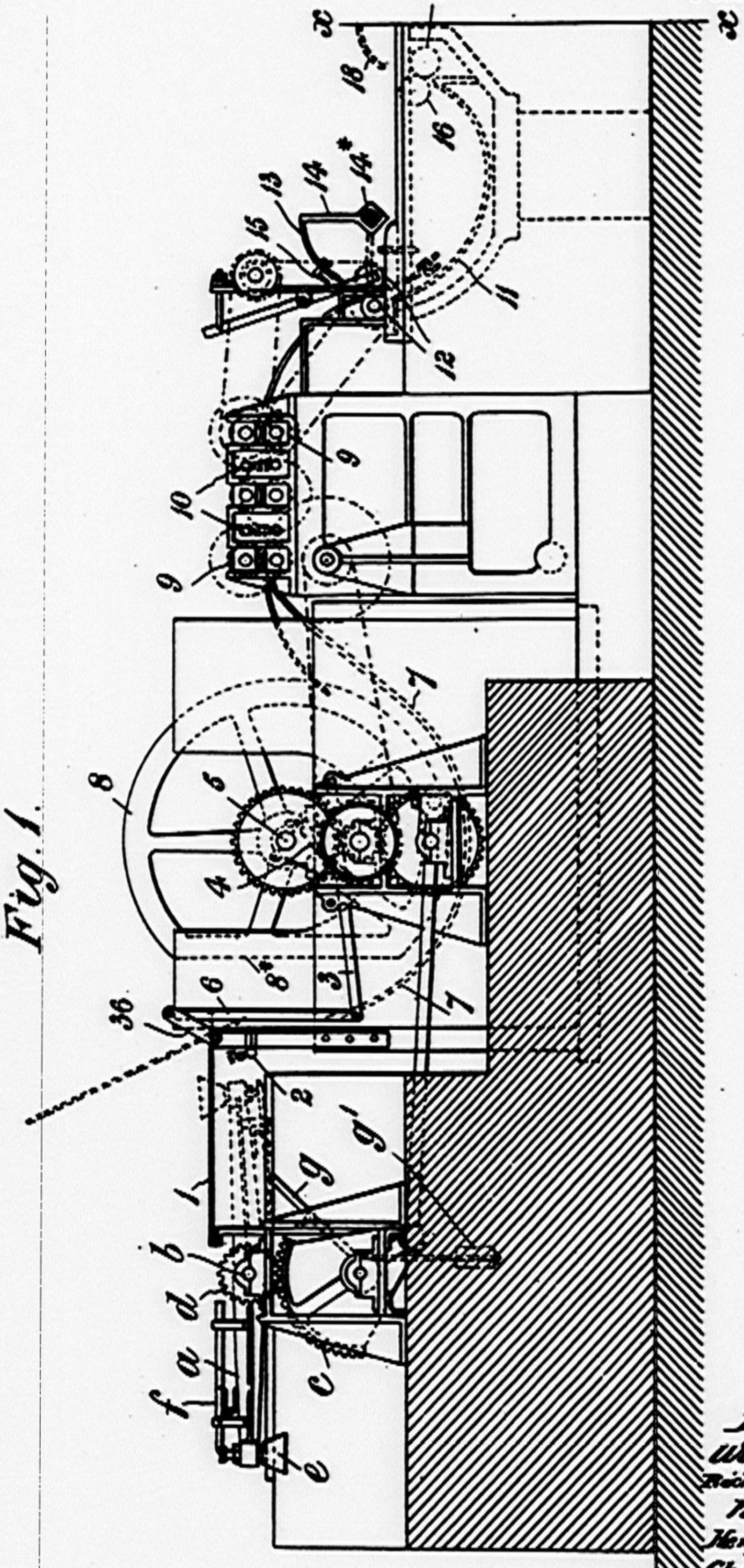

Fig. 1.

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3 SHEETS—SHEET 2.

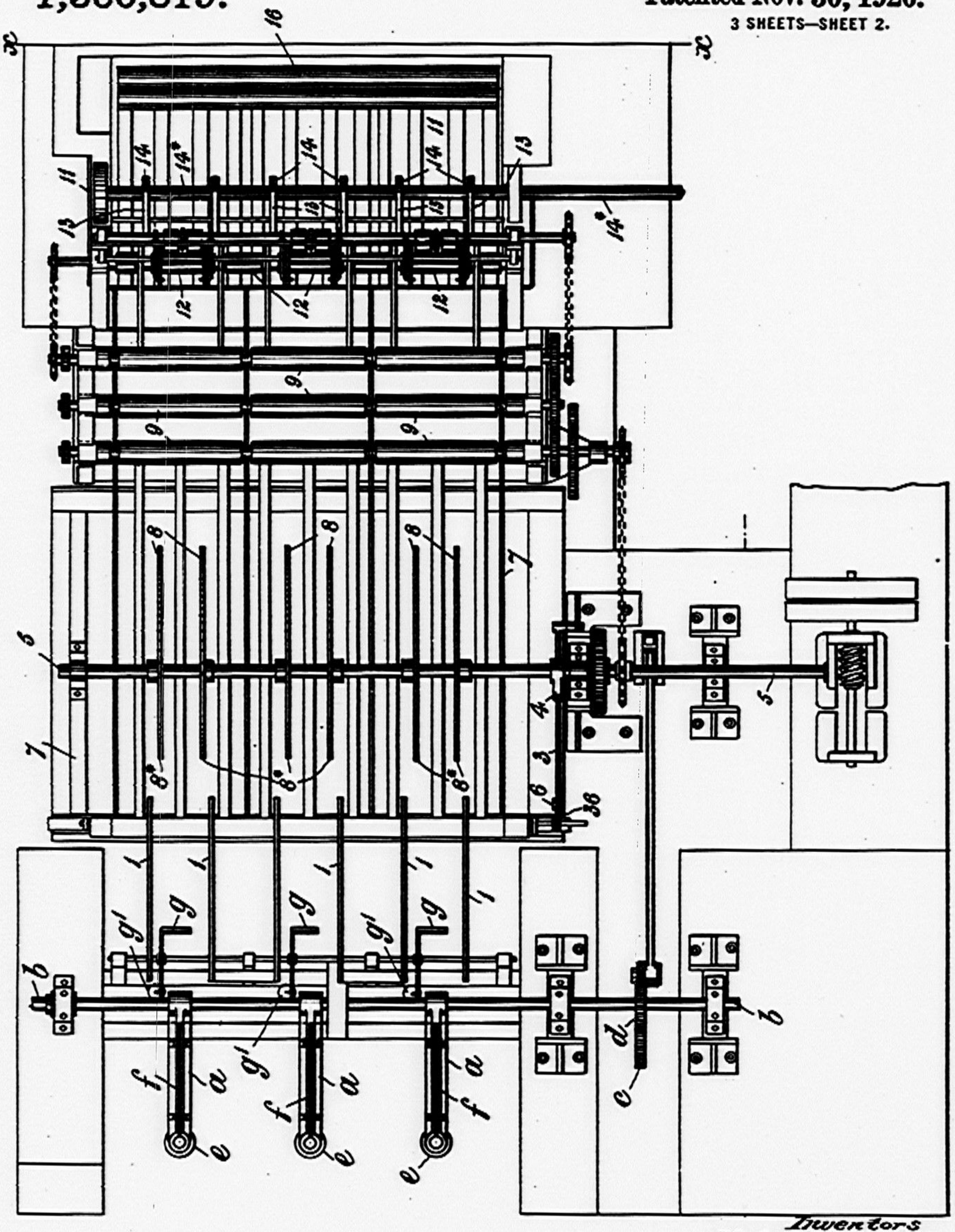

Fig. 2.

Witnesses
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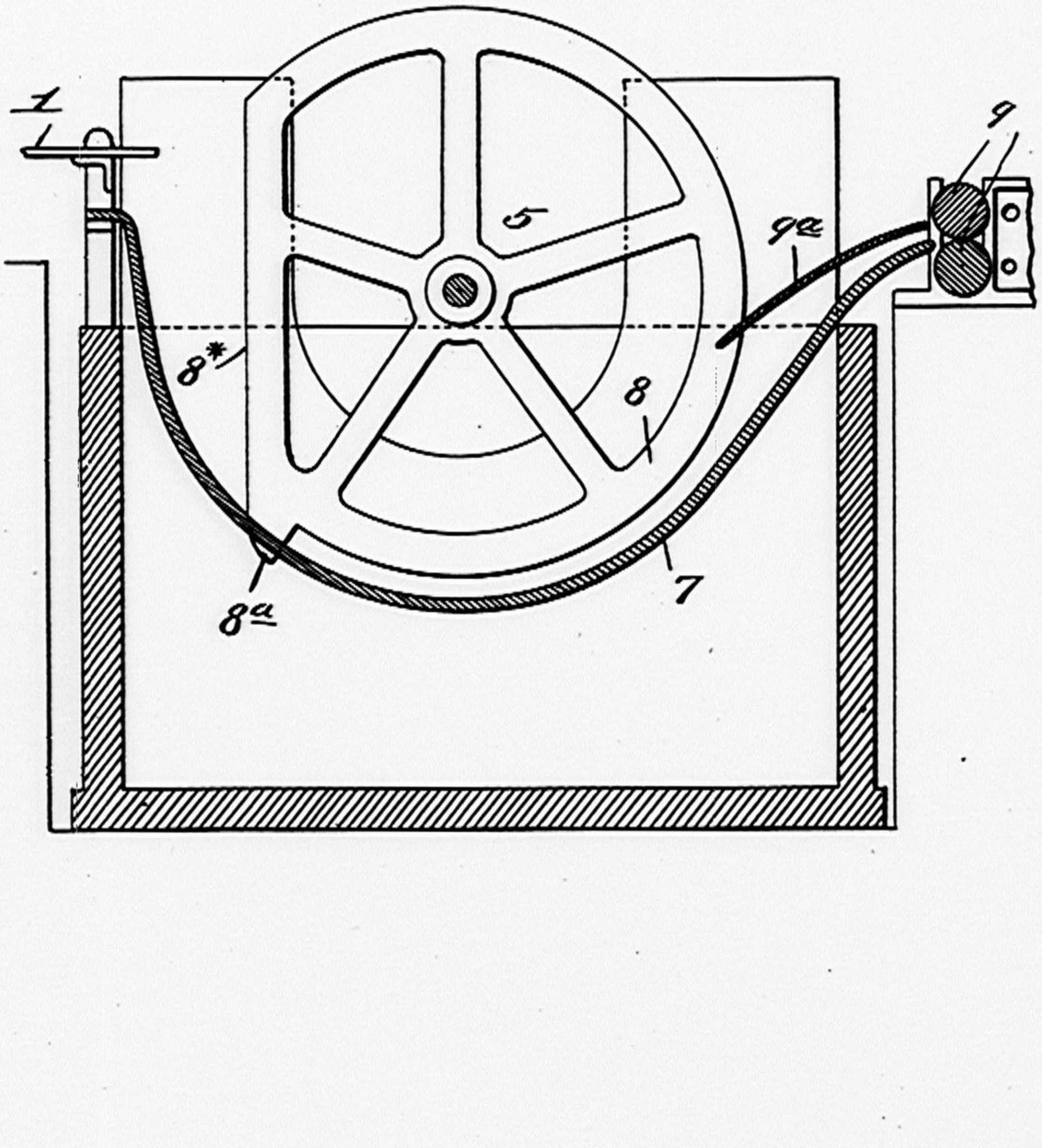
APPLICATION FILED MAY 26, 1917.

1,360,819. Patented Nov. 30, 1920.
3 SHEETS—SHEET 3.

Fig. 3.



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UNITED STATES PATENT OFFICE.

HUBERT SPENCE THOMAS, OF LLANDAFF, AND WILLIAM ROBERT DAVIES, OF WHITCHURCH, NEAR CARDIFF, WALES, AND RICHARD BEAUMONT THOMAS, DECEASED, LATE OF LONDON, ENGLAND, BY NORA CONSTANCE BEAUMONT THOMAS, OF ENGLEFIELD GREEN, ENGLAND, HENRY ROBERT WILLIAM ANDERSON, OF LONDON, ENGLAND, AND CHARLES BATHURST, OF LYDNEY, ENGLAND, EXECUTORS.

MANUFACTURE OF COATED PLATE AND APPARATUS THEREFOR.

1,360,819. Specification of Letters Patent. **Patented Nov. 30, 1920.**

Original application filed October 31, 1914, Serial No. 869,666. Divided and this application filed May 26, 1917. Serial No. 171,323.

To all whom it may concern:

Be it known that HUBERT SPENCE THOMAS, a subject of the King of Great Britain, residing at Llandaff, county of Glamorgan, Wales, and WILLIAM ROBERT DAVIES, a subject of the King of Great Britain, residing at Whitchurch, near Cardiff, county of Glamorgan, Wales, and RICHARD BEAUMONT THOMAS, deceased, formerly a subject of the King of Great Britain, and lately residing at London, S. W., England, (NORA CONSTANCE BEAUMONT THOMAS, widow, HENRY ROBERT WILLIAM ANDERSON, clerk in holy orders, chaplain to His Majesty's forces, and Sir CHARLES BATHURST, K. B. E., captain in His Majesty's army, barrister at law, and member of Parliament, subjects of the King of Great Britain, residing, respectively, at The Glade, Englefield Green, in the county of Surrey, England, 80 Redcliffe Gardens, London, England, and Lydney Park, Lydney, in the county of Gloucester, England, executors of RICHARD BEAUMONT THOMAS,) have invented certain new and useful Improvements in the Manufacture of Coated Plates and Apparatus Therefor to be Employed in the said Manufacture, of which the following is a specification.

The said invention relates to the manufacture of tin and terne plates and other like metal coated plates or sheets consisting in immersing the plates or sheets separately in pickle so as to effect the chemical cleaning of the same, the said plates or sheets being subsequently swilled, preparatory to their being tinned, branned and dusted, and the said invention consists of the new or improved apparatus hereinafter described whereby the plates or sheets to be tinned are automatically taken one by one from a pile or piles of plates or sheets arranged at the front end of the machine and are passed first into the pickling bath and then by pairs of rolls to the tin-pot being brought under the action of a water swilling appliance arranged between the exit end of the pickling bath and the entrance end of the tin-pot both sides of each sheet or plate being thereby washed free from pickling acid, the whole of the operations being carried out continuously and automatically, that is to say, without the intervention of hand labor.

We will describe the said invention in connection with the accompanying drawings in which—

Figure 1 represents in side elevation an apparatus constructed in accordance with the present invention,

Fig. 2 shows the same in top plan, and

Fig. 3 represents a vertical section through the pickling bath.

The same letters and figures of reference indicate the same or corresponding parts in both figures of the drawings.

At the front end of the machine is an automatic or mechanical feeder for taking the plates or sheets to be tinned singly or one by one from a pile or series of piles of plates or sheets placed on supports at the said front end of the machine.

The automatic or mechanical feeder consists of an arm or lever *a* or a series of levers *a* fixed to a rocking shaft *b* which receives a forward and backward partial rotation through the gearing of the toothed quadrant *c* with the pinion *d* on the said shaft *b*. The arm or lever *a*, or each arm or lever *a* where more than one are employed, carries at its free end a suction cup *e* of india rubber or the like having therein a spring pressed valve which is opened against the action of its spring by a lever *f* on the back of the arm *a* when the said lever *f* is by the forward motion of the arm *a* brought against a stop lever *g* the motion of which is retarded by the weight g^1. When by the backward motion of the arms *a* the suction cup *e* is brought against and is pressed on to the uppermost plate or sheet in the pile the edge of the cup is spread out and consequently on the reverse motion of the arm *a* suction is produced in the cup *e* and the uppermost plate or sheet in the pile is lifted or taken up and carried over on to tilting bars or a tilting platform 1, the suction of the cup being released as soon as or immediately before the plate or sheet reaches the tilting bars or platform 1 by the opening of the spring pressed valve of the cup *e*. The cup *e* is wetted before the arm *b* commences its backward motion so as to insure a perfect suction when brought into contact with the next uppermost plate. The wetting of the suction cup *e* may be effected by jets of water issuing from holes in a water delivery pipe 2 the holes being in such positions in the pipe 2 that the water is received in the cups *e* when they are below the level of the said pipe.

The tilting platform 1 is turned into the nearly vertical position indicated in dotted lines in Fig. 1 when a plate or sheet is delivered thereon by the operation of a lever 3 actuated by a wiper cam or the like 4 on the shaft 5 the lever 3 acting through the connecting rod 6 and link 36 on the spindle of the tilting platform 1.

The plates or sheets are delivered by the tilting platform 1 to the trough shaped or curved guides 7 of a pickling bath, in which bath wheels or disks 8 rotate, the wheels or disks being fixed on the shaft 5, and having a flat or cut away part 8* at one side to permit the plates or sheets to enter the bath. The wheels or disks also carry projections 8ᵃ which extend through or between the curved guides 7 to engage the back edges of the plates and thus operate to push the plates or sheets through the bath and over the curved guides 7 until their front edges are seized by the first pair of rolls 9, 9. A deflector 9ᵃ is arranged to engage the front edge of each advancing sheet and thus direct the sheet between the rolls 9. The swilling of the plates or sheets free of pickling acid is effected by a row or series of water jets issuing from water delivery pipes 10, 10 situated adjacent the rolls 9, 9, and above and below the line along which the plates or sheets are carried by the rolls 9, 9 to the tin-pot 11. At the entrance end on the tin-pot 11 is a pair of rolls 12, 12 rotating at such a speed that the plates or sheets are carried by them more quickly through the flux on the surface of the molten tin at the entrance end of the tin-pot 11 than through any other part of the apparatus. The plates or sheets after they have passed through the rolls 12, 12 are carried through the tin-pot 11 by curved extensions 13 of radial arms 14 on the shaft 14* the curved extensions 13 terminating in fingers 15 which engage with the rear edge of the plate or sheet until it is seized by the pair of rolls 16, 16 by which it is transferred to mechanisms which perform subsequent operations on the plates.

From an examination of the plan Fig. 2, it will be seen that the machine is made of a width proper to take three sheets abreast or side by side, the three suckers *e*, *e*, *e* at the front end of the machine simultaneously picking up three single plates or sheets from three separate piles arranged at the front end of the machine. From this arrangement the output of the machine is largely increased.

By the machinery or apparatus hereinbefore described and illustrated in the accompanying drawings the plates or sheets to be tinned can be taken one by one from a pile, or series of piles at the front end of the machine and can be carried through the whole series of operations without the intervention of hand labor.

We claim—

1. In a machine for handling flat plates or sheets, the combination of a receptacle having a curved bottom for the travel thereover of the plates or sheets, and rotary members having peripheries concentric with the curved bottom of the receptacle and flat portions in their peripheries and adjacently located projections extending outwardly from the concentric portions of their peripheries to coöperate with the upper sides and back edges of the sheets to advance the latter around the curved bottom of the receptacle.

2. In a machine for handling flat plates or sheets, the combination of a receptacle having a curved bottom for the travel thereover of the sheets or plates, rotatable members having peripheries adjacent to and concentric with the curved bottom of the receptacle and having flat or cut away peripheral portions to coöperate with a side of the sheet, and means for feeding a plate or sheet to the receptacle while the flat peripheral portions of said members are presented to the entrance end of the receptacle, continued rotation of said members causing the plate or sheet to be advanced through the receptacle.

3. In a machine for handling flat plates or sheets, a swilling appliance comprising pairs of feed rolls adapted to advance the plates or sheets between them, and water delivery pipes located between adjacent pairs of feed rolls and at opposite sides of the path of the plates or sheets, said water delivery pipes having perforations operative to spray and thus wash both sides of the plates or sheets as the latter are fed by the pairs of feed rolls.

4. In a machine for handling flat metallic

plates or sheets, the combination of a receptacle having a curved bottom, means for mechanically feeding the plates or sheets successively to said receptacle, and a pusher rotatable in a path above the curved bottom of the receptacle, and having a flat portion to receive the plates from the feeding means and to engage the upper flat surface of the plates or sheets and thus submerge the same while advancing over said curved bottom.

In testimony whereof we have hereunto set our hands.

HUBERT SPENCE THOMAS.
WILLIAM ROBERT DAVIES.

NORA CONSTANCE BEAUMONT THOMAS,
HENRY ROBERT WILLIAM ANDERSON,
CHARLES BATHURST,
Executors of Richard Beaumont Thomas, deceased.

Aug. 16, 1932. S. C. SAUNDERS ET AL **1,872,507**

RUST PROOFING APPARATUS

Filed April 2, 1930

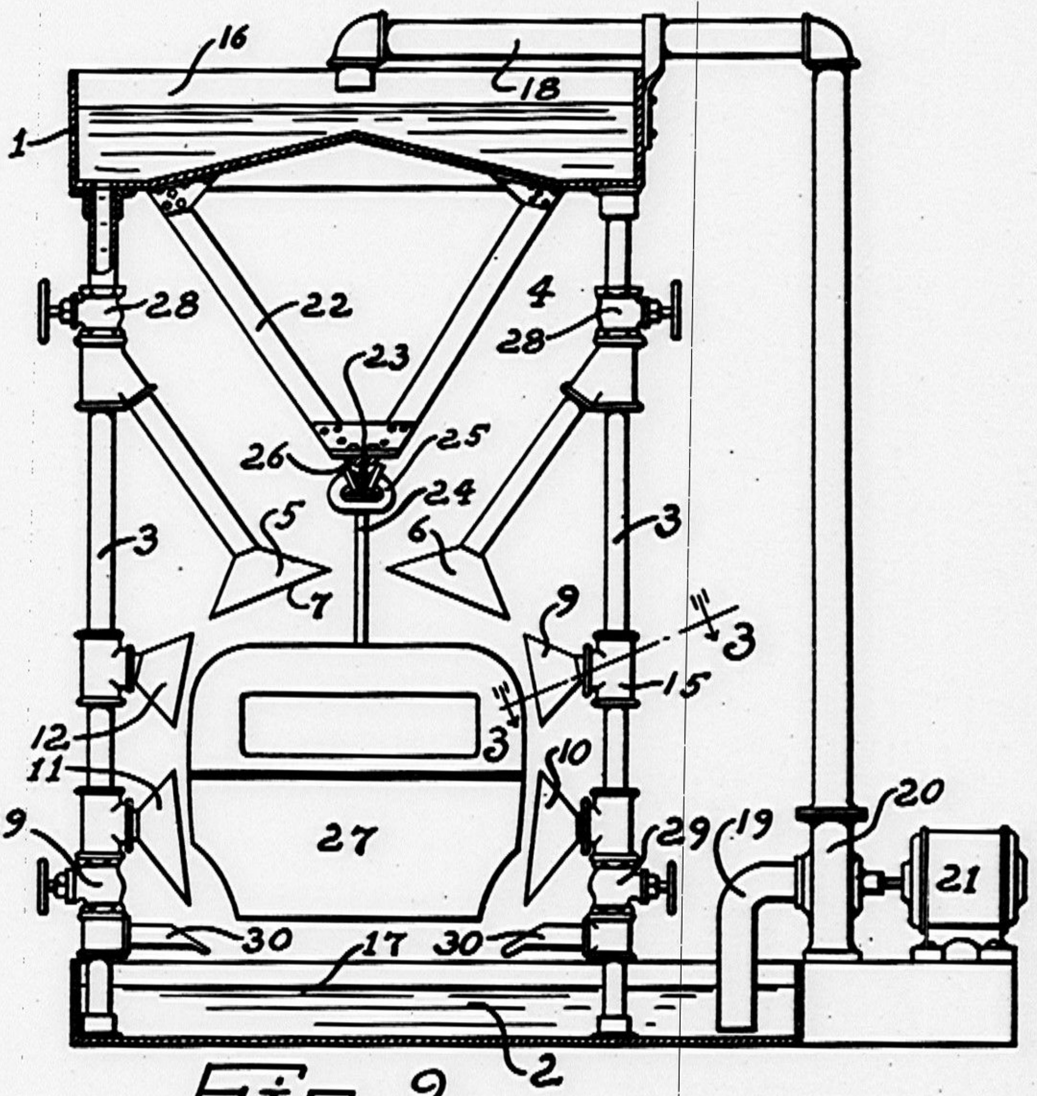

Fig. 2.

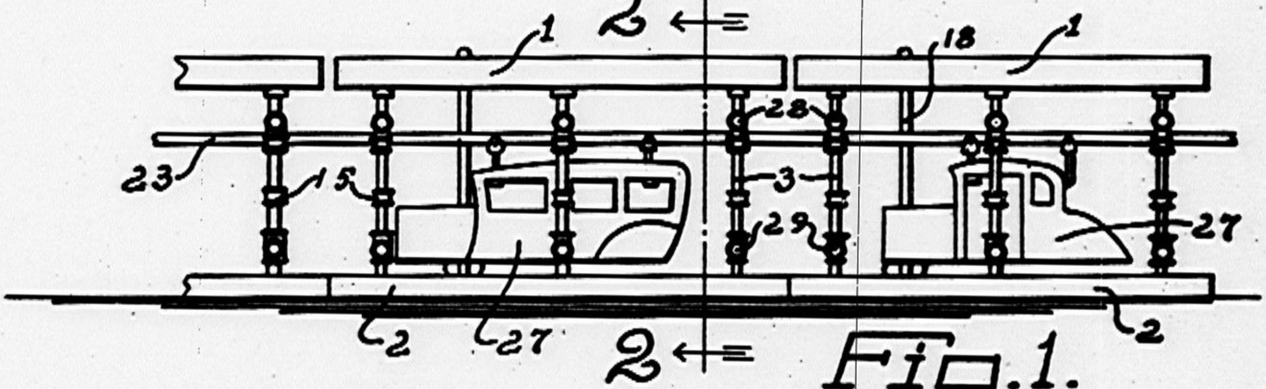

Fig. 1.

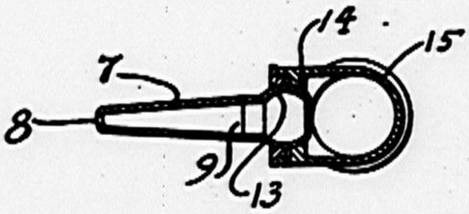

Fig. 3.

INVENTOR
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BY CHARLES C. WILLIAMS.
J. King Harness
ATTORNEY

UNITED STATES PATENT OFFICE

SEYMOUR G. SAUNDERS, OF BIRMINGHAM, AND CHARLES C. WILLIAMS, OF DETROIT, MICHIGAN, ASSIGNORS TO CHRYSLER CORPORATION, OF DETROIT, MICHIGAN, A CORPORATION OF DELAWARE

RUST PROOFING APPARATUS

Application filed April 2, 1930. Serial No. 441,117.

This invention relates to an improved means for rust proofing metal bodies, particularly automobile bodies.

Heretofore, in treating automobile bodies with rust proofing solutions such as bonderizing and parkerizing solutions, it has been customary to submerge the bodies in tanks or baths of enormous capacity. This method involves employment of vast quantities of the solution and space consuming equipment and causes substantial loss by vaporization. The weight of the tanks and baths frequently prohibits their installation on upper floors of plant buildings where they should properly be located to maintain continuous production lines.

The main objects of this invention are to provide an improved means for treating bodies with rust proofing solutions which does not require heavy space consuming equipment and the utilization of large quantities of liquid; to provide improved spraying apparatus for applying a rust proofing solution on continuously moving bodies; to provide means of this kind by which the entire exterior of a body is sprayed with the solution during continuous movement of the body; and to provide improved spraying nozzles which discharge the solution substantially in sheet form.

Further objects of this invention are to provide means for washing vehicle bodies with alkali, rinsing the bodies with water, treating the same with a rust proofing solution and finally rinsing the excess solution in spraying operations during progressive movement of the body.

An illustrative embodiment of this invention is shown in the accompanying drawing, in which:

Fig. 1 is a fragmentary side elevation of our improved spraying apparatus.

Fig. 2 is a vertical section taken on line 2—2 of Fig. 1.

Fig. 3 is a section taken on line 3—3 of Fig. 1.

In the form shown, our improved rust proofing apparatus includes a series of pairs of tanks 1 and 2 which are located one above the other. The spraying units are substantially identical and for this reason only one unit is specifically described herein. The upper tank 1 is supported upon pipes 3 which extend into the lower tank 2 and communicate at their upper ends with the upper tank 1. These pipes are arranged along the longitudinal edge portions of the tanks 1 and 2 forming a passageway 4.

An upper pair of nozzles 5 and 6 having elongated discharge ends 7 in which a slot 8 is formed, communicate with the pipes 3. The elongated ends 7 of the discharge nozzles 5 and 6 are disposed at opposite inclinations to each other and are located substantially at the center of the passageway 4.

Communicating with the pipes 3 are lower nozzles 9, 10, 11 and 12 which are located at the sides of the passage 4. These nozzles are substantially alike in construction and they each have a ball joint part 13 which is swiveled in a socket 14 of a T-shaped pipe connection 15.

The tanks 1 and 2 have open upper extremities 16 and 17 into which a filling pipe 18 and a suction drain pipe 19 respectively extend. The drain pipe 19 is connected with the inlet of a pump 20 having a driving motor 21 and the pipe 18 is connected with the outlet of the pump.

Mounted on the lower wall of the upper tank 1 is a supporting structure 22 which extends into the passageway 4 and supports a track 23. Shiftably mounted on the track 23 are supports 24 having a yoke shaped head 25 on which rollers 26 are journaled. The supports 24 are adapted to convey a metal automobile body 27 longitudinally through the passage.

In operation, rust proofing solution is fed into the upper tank 1 from a source, not shown. The solution passes downwardly under the action of gravity through the pipes 3 and into the nozzles from which it is discharged in sheet like form on the exterior of the body 27 while the body is moving progressively through the passage. The discharge ends 7 of the nozzles substantially form an arch through which the body 27 is conveyed. The excess solution drips from the body 27 and is collected in the lower tank or pan 2 from which it is lifted through the pipes 18 and 19, by the pump 20 into the upper tank 1 where it is again discharged or allowed to recirculate through the system. The lower nozzles 9, 10, 11 and 12 may be adjusted in position so as to correspond to the curvatures of the upper and lower portions of bodies of different types, thereby assuring application of the solution on the entire side and curved surfaces of the body.

Upper and lower valves 28 and 29 are provided in the pipes 3 for permitting either of the tanks to be completely drained, so as to allow convenient cleaning thereof. By closing the upper valves 28 all the solution may be retained in the upper tank 1 and by opening the lower valves 29 the solution may be drained through the outlets 30 directly into the lower tank 2.

The adjacent spraying units illustrated in Fig. 1, are intended to be used in a continuous body treating process in which the first spraying unit from the right is provided with a washing solution containing an alkali, the second is provided with a rinsing liquid, such as water, the third is provided with a rust proofing solution, and the fourth, not shown, is provided with a rinsing solution such as water. With this apparatus, the vehicle bodies are successively subjected first to an alkali wash, then to a rinsing solution, then to the rust proofing solution and lastly to a final rinsing solution while the bodies are progressively moved through the passage between the pipes 3.

Although but one specific embodiment of this invention has herein been shown and described, it will be understood that various changes including the size, shape and arrangement of parts may be made without departing from the spirit of our invention and it is not our intention to limit its scope other than by the terms of the appended claims.

We claim:

1. In apparatus for rust proofing bodies, a pair of spaced tanks, one above the other, side pipes communicating with the upper tank and forming a passage bounded by said tanks and side pipes, means in said passage for shiftably supporting a body, and a plurality of outlet nozzles located below said upper tank communicating with said side pipes and extending inwardly into said passage, the discharge ends of said nozzles forming an arch for receiving said body, and means for feeding a rust proofing solution from the lower tank to the upper tank.

2. A device of the class described comprising an upper rust proofing solution tank, pipes below said tank for supporting the latter and communicating with the side portions thereof forming a passageway therebetween, a track extending longitudinally of said passageway, means movably mounted on said track for conveying a body through said passageway, and a plurality of nozzles communicating with said pipes and extending inwardly of said passageway, the discharge ends of said nozzles forming an arch in the interior of said passageway for receiving said body.

3. A device of the class described comprising an upper rust proofing solution tank, pipes below said tank for supporting the latter and communicating with the side portions thereof forming a passageway therebetween, a track extending longitudinally of said passageway, means movably mounted on said track for conveying a body through said passageway, a plurality of nozzles communicating with said pipes and extending inwardly of said passageway, the discharge ends of said nozzles forming an arch in the interior of said passageway for receiving said body, a lower tank at the bottom of said passageway for collecting said rust proofing solution after it has drained from said body, and means for pumping the collected solution into said upper tank.

4. In a device of the class described a series of adjacent tanks, pipes communicating with the side portions of said tanks supporting the same and forming a continuous passage therebelow, a support on said tanks extending longitudinally through said passage, a plurality of nozzles communicating with said tanks having their discharge ends directed inwardly of said passage, and means movably mounted on said support for progressively conveying bodies through said passage and past said nozzles to subject said bodies to the action of respectively different contents of said tanks.

SEYMOUR G. SAUNDERS.
CHARLES C. WILLIAMS.

Feb. 13, 1934. A. H. SHONKWILER ET AL **1,946,766**

FINISHING FERROUS SHEET MATERIAL

Filed April 8, 1933

Fig. 1.

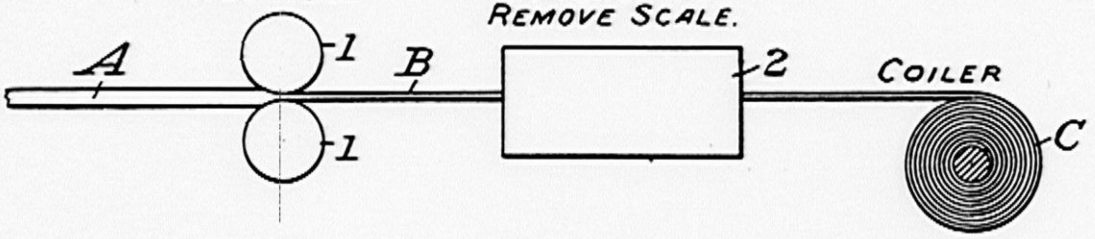


Fig. 2.

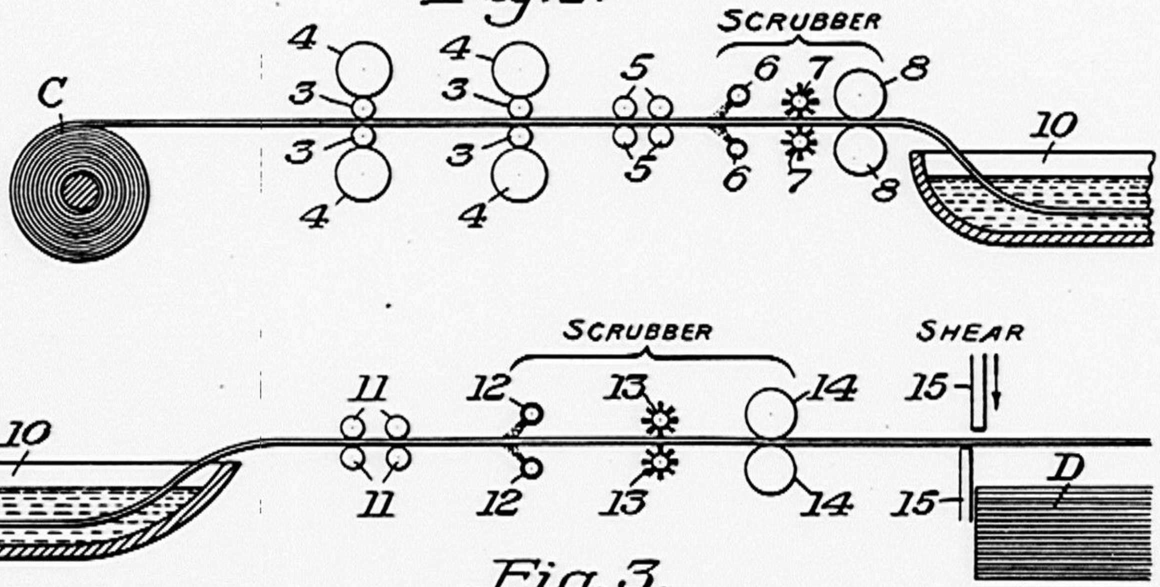


Fig. 3.

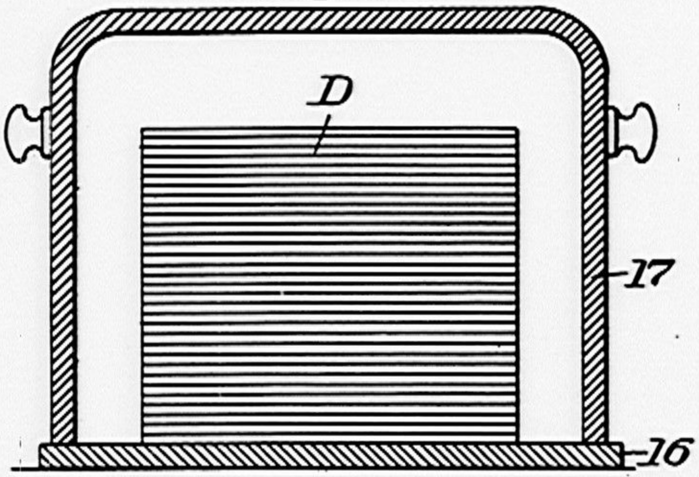
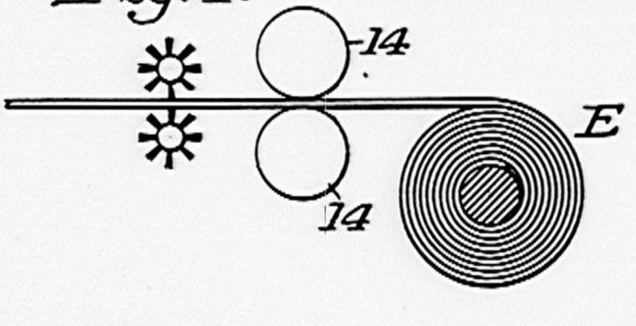


Fig. 4.



INVENTOR

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Donald M. Shanafelt

by

Byrnes, Stebbins, Parmelee & Blenko
his attorneys

Patented Feb. 13, 1934 **1,946,766**

UNITED STATES PATENT OFFICE

1,946,766

FINISHING FERROUS SHEET MATERIAL

Albert H. Shonkwiler and Donald M. Shanafelt,
Steubenville, Ohio

Application April 8, 1933. Serial No. 665,186

11 Claims. (Cl. 148—4)

This invention relates to the finishing of cold rolled ferrous sheet material. More particularly, the invention relates to steps in the process of producing ferrous sheet material by a cold rolling method which shall result in the production of ferrous sheet material which takes paints or lacquers readily and whose surface has characteristics rendering it less liable to be scratched and marred.

We use the expressions "ferrous sheet material" and "sheets" as terms of general definition and not of limitation, and intend to include thereby any ferrous sheet-like materials, such as those known to the trade by the technical terms "strip sheet", "strip", "sheets", "plates", etc.

As cold rolled sheet material has come into more extensive use, particularly in the automobile trade, difficulty has arisen in its use due to the unusually bright glossy surface which will not retain paint or lacquer. A dull finish is particularly desirable for several reasons. The dull finish sheet does not show scratches in handling, neither is it susceptible to marks resulting from being drawn by dies. The dull finish sheet has better drawing qualities, due to a better gripping of the sheet when drawing with dies. Moreover, due to the dull finish, lacquer adheres better to a sheet whose surfaces have a dull finish.

As is well known, the usual cold rolling procedure imparts to the ferrous sheet material a bright glossy surface. To do away with this hard glossy surface, two procedures have been resorted to.

In the first of these known procedures, the cold rolled strip in a coil is open annealed at about 1650° F. and air-quenched. This process is commonly known as "normalizing", since it results in a so-called normalized fine grain structure. As a result of this open annealing, oxide scale is formed on the surface of the material; and when this oxide scale is removed in the subsequent pickling operation, a dull finish results. The pickled coil is then sheared into lengths, and the sheets are given two passes in a cold mill under light pressure to flatten the sheet. The sheets are then given a box annealing and are then given two light passes in a cold mill.

The second procedure is to shear the cold rolled strip into lengths, and then open anneal the sheets to above the critical temperature to form a coating of oxide on the surface of the sheets, and then air-quench, or normalize. This oxide or scale is removed by pickling in sulphuric acid, then passed through a cold mill to straighten them, after which the sheets are box annealed and subjected to two passes in a cold mill to slightly harden the surface so that it draws without slippage of the grain of the surface.

We have discovered that cold rolled ferrous sheet material may be finished with surfaces having improved qualities for receiving paint or lacquer by a procedure which is less costly than the two procedures above outlined. In accordance with our preferred process, the cold rolled strip is passed through an etching bath, then sheared into lengths and box annealed.

Following the box annealing, the lengths of material are subjected to two cold roll passes to slightly compact the surface. As a modification of this procedure, the cold rolled strip may be sheared into lengths before the etching step. The sheared sheets are etched, box annealed, and subjected to two cold roll passes as is the procedure with the embodiment first described.

Our invention results in a considerable reduction in the cost of producing dull finished sheets from cold rolled sheet material. Both of the procedures above described as known heretofore involve open annealing which costs about $3.50 per ton. This open annealing is followed by pickling in sulphuric acid which costs about $3.00 per ton. The two passes in the cold mill to straighten the sheets cost about 90¢ per pass or $1.80 per ton for the two passes.

In our process, the cost of the etching step is about $1.90 per ton. The open annealing, the expensive pickling, and the straightening are done away with, with the result that a saving of about $6.50 per ton is effected over the old practice.

In order to present a clear and complete teaching of our invention, we have shown diagrammatically in the accompanying drawing a succession of steps which may be carried out in accordance with our invention. In the drawing which is intended merely as illustrative and not as limiting the invention to the precise details shown,

Fig. 1 shows the hot rolling process by which ferrous sheet material is produced;

Fig. 2 shows the cold rolling steps followed by the treatment of the surfaces of the sheet material to etch the same;

Fig. 3 shows in section an annealing box in which the annealing step may be performed; and

Fig. 4 indicates an alternative manner in which annealing may be carried out.

passing heated metal A between hot rolls 1, 1. The rolled strip B is passed through a pickling bath 2 to remove the scale formed at this high temperature on the hot strip, and is coiled as indicated at C. It will be understood that the hot rolling is so carried out that the thickness of the strip B is greater by at least a third than that desired in the finished product, and generally the strip B is twice as thick.

The coil of pickled strip is then cause to travel through the passes of two cold rolling mill stands arranged in tandem. As is customary, a pair of comparatively small cylindrical alloy rolls 3, 3 of great hardness are backed up by larger rolls 4, 4 by which the smaller rolls are maintained in contact with the strip. In the embodiment shown in the drawing, feed rolls 5, 5 are arranged beyond the cold rolling mills to advance the strip at the desired speed. Sufficient pressure is exerted by the rolls 3, 3 so that the original grains which are fairly large in the hot rolled strip are stretched out and broken up into small grains.

Subsequent to the cold rolling, the oil which is generally applied to the surface of the strip at the time of cold rolling is removed. A scrubber may be employed which, as shown in Fig. 2, comprises spray pipes 6, 6 for spraying the upper and lower surfaces of the strip with alkali and/or water, followed by brushes 7, 7 for scrubbing the surfaces of the sheet, and wringer rolls 8, 8 of soft rubber for removing excess moisture.

The cleaned strip is now ready to have its surfaces treated to remove the high gloss. As shown in Fig. 2, the strip is passed into a tank containing in solution nitric acid or a nitric acid compound which will break up when dissolved in a bath of sulphuric acid, freeing nitric acid by the reaction. On a basis of cost, the preferred etching solution contains sodium nitrate and sulphuric acid. As a specific example, we have employed a water solution containing 2% by weight of sodium nitrate and 5% by volume of 60° Bé. sulphuric acid. The etching bath is preferably employed at room temperatures. The temperature should not be allowed to exceed about 100 to 110° Fahrenheit, since the valence and chemical activity of iron increase with increase in temperature, and accordingly a large amount of acid would be wasted at high temperatures in oxidizing the iron into ferric form.

The etching solution must be such as will actively attack the steel. Sulphuric acid or hydrochloric acid is not sufficiently energetic to attack the hard cold rolled surface. The action of the nitric acid is apparently to oxidize the material to form an iron oxide which is soluble in sulphuric acid. This is indicated by the fact that the etching bath has to be enriched almost entirely with sulphuric acid and there is a very slight consumption of nitric acid.

Other source of nitric acid such as potassium nitrate is usable; but as market conditions now exist, sodium nitrate is the cheapest. Picric acid likewise is usable and will etch the surface of the sheets; but the cost at present is prohibitive. The same is true of ferric chloride, or ferric chloride together with sulphuric acid.

The time allowed for immersion in the bath is governed so as to permit sufficient etching to remove the gloss or hard polish from the strips or sheets, while avoiding sufficient attack on the surfaces to waste metal and acid, or impair the surface. With the strip travelling at a speed of

afford an immersion of the strip for ten seconds. The amount of etching can be varied by varying the time of immersion of the strip in the etching bath, or by varying the strength of the etching acid employed.

After the strip emerges from the tank 10, the the strip passes between additional feeder rolls 11, 11 and is washed for the purpose of removing the adherent etching solution. If desired, an alkali solution (such as sodium carbonate) may be applied either as a second bath or as a spray. As shown in Fig. 2, a second scrubber is employed comprising spray pipes 12, 12, brushes 13, 13 and wringer rolls 14, 14.

After the etching solution is removed by the second scrubber, the strip passes either through the shears 15, 15, being severed into sections which are deposited in a pile D, or is delivered to a coiling machine and fashioned into a coil E as shown in Fig. 4.

Subsequently, the pile D or the coil E as the case may be, is laid on a bottom plate 16, covered by a suitable box top 17, and the whole placed in a furnace where it is raised gradually to such temperature as to soften the ferrite without producing objectionable grain growth, for example, a temperature of about 1200° to 1300° F. Sufficient time is allowed for the heat to penetrate into the interior of the pile or coil. For instance, annealing for forty hours at a furnace temperature of approximately 1300° F. is sufficient to take out the strains caused by cold rolling and to somewhat round out the small grains produced as a result of the crushing effect of the rolls 3, 3. The annealing at 1300° does not, however, interfere with the fineness of the grain produced by the cold rolling; and a finer ultimate grain structure is obtained than has been possible with the two procedures above described as already known, in which the heat treatment at above 1650° F. completely eliminates the fine grain structure and forms a new normalized grain structure due to the heating and air quenching.

After the box annealing, the sheets should ordinarily be given two cold roll passes to slightly compact the surfaces of the sheets. The effect of these passes is sufficient merely to harden the surface while leaving the interior fully annealed; and accordingly, strains in subsequent operations are avoided. The cold rolled effect is very superficial and reduces the thickness from a quarter-thousandth to two-thousandths of an inch.

In preparing sheets for the application of vitreous enamel, a sheet with a sufficiently matte surface to hold the vitreous enamel is desired. The usual procedure which has been employed has been to hot roll the thin sheets in packs. Sheets which are thus hot rolled in packs can be pickled and the oxide removed so as to give a matte surface. Our procedure described above may be employed for obtaining the desired matte surface for sheets to be coated with vitreous enamel by prolonging the time allowed for the etching of the sheets somewhat beyond the time required for the dull finish for lacquered sheets and sheets for automobile bodies. The sheets thus produced are superior to the sheets obtained by the pack rolling procedure, in that they are free from deep surface pits; and moreover, the procedure entails considerably less expense. The sheets produced in accordance with our process have the advantages in drawing with dies of the rolling; and at the same time, the surface of the sheet has been sufficiently roughened to give the "sharp teeth" required for holding the vitreous enamel. Not only does the old procedure, involving pickling with sulphuric acid of the sheets hot rolled in packs, lead to marring of the sheets by deep surface pits; but this old procedure causes losses in the enameling process due to boiling of the enamel (probably due to some foreign inclusions on the surface which have not been entirely removed by the sulphuric acid pickle). Sheets produced in accordance with our process do not give rise to this difficulty (nitric acid seemingly being effective to completely remove such surface inclusions).

Our process for finishing ferrous sheets for general utility, such as automobile bodies, has this same advantage, namely, that the sheets produced have surfaces which are free of the small pits quite generally formed on the surfaces of sheets subjected to the open anneal and sulphuric acid pickle in accordance with known procedures. These known procedures result in the rejection of a considerable percentage of sheets because of this objectionable pitting of the surfaces; and often sheets which are not rejected have some tendency to show small objectionable pits.

The dull finish sheets produced by our process may also be advantageously used for galvanizing where a tightly adherent zinc coating is desired, since the surface etching furnishes an exceptionally good anchorage for the zinc coating to the steel. Our dull finish sheets can also be advantageously employed for terne coats.

There is a further decided advantage in our procedure over the known procedures in that sheets produced in accordance with the old procedure are very soft, having a Rockwell of 40 to 55 on the B scale as they come from the open anneal; and are likely to be scratched in handling prior to the box annealing. Sheets produced in accordance with our process are full hard, having (following the etching step) a Rockwell of about 88 to 93 on the B scale, so that danger of scratching prior to box annealing is eliminated. This freedom from scratches is particularly advantageous where paint or lacquer is to be applied to the finished product. In the case of sheets produced by the old procedures, these scratches show through the paint or lacquer; and consequently polishing of the steel before applying of the paint or lacquer must be resorted to in order to take out the blemish due to the sub-surface scratches and pits. The necessity for polishing after painting or lacquering has been practically eliminated with the dull finish sheets produced in accordance with our invention.

A further advantage resulting from the use of the etching bath is the readiness with which the stack of sheets may be unpacked after the box annealing. If a pile of cold rolled sheets with the hard polished surfaces resulting from the cold rolling be box annealed, the adjacent faces of the material adhere so tenaciously at the end of the annealing step that it is sometimes an arduous task, if not altogether impossible, to separate the surfaces due to the sheets welding to each other. The dull surfaces resulting from the etching step of our process entirely eliminate any tendency on the part of adjacent surfaces to adhere together.

The dull finish cold rolled sheets produced in accordance with our invention have a further quality which is of importance in connection with drawing of the sheets in dies. The Olson ductility tests for 20 gauge sheets show about .400 to .420 on sheets produced in accordance with our invention, as against .385 to .400 on the sheets made in accordance with the old process in which the sheets were normalized. The greater ductility in the sheets which are etched and box annealed in accordance with our process is, we believe, due to the crushed grain resulting from the cold rolling of the strip. During the box anneal at a relatively low temperature, the cold working strains within the grain structure are eliminated, but no objectionable grain growth results; and improved ductility of the sheet is a consequence of the series of steps taught herein. Experience has shown that sheets having the crushed grain structure resulting from cold rolling have greater ductility than sheets having the fine grain structure resulting from a normalizing treatment.

Low carbon steels constitute the material usually used for the production of drawing steel or sheets used for automobiles or for vitreous enameling. It will be understood, however, that our invention is not limited to application of the steps set forth to steel which are low in carbon. It is contemplated that various steels including those in which other metals are alloyed with iron come within the contemplation of the process constituting our invention.

This application is a continuation-in-part of our copending application Ser. No. 539,698, filed May 25, 1931.

While we have specifically described certain preferred embodiments of our invention, including specific formulæ for the etching bath in which etching of the polished surfaces may be carried out, it is to be understood that the invention is not so limited, but may be otherwise embodied and practiced within the scope of the following claims.

We claim:

1. In the process of producing ferrous sheet material by first hot rolling, then cold rolling, and then finishing, the finishing steps consisting in etching the cold rolled material by treatment with a solution containing the nitric acid radical in active form, and then annealing the etched material.

2. In the process of producing ferrous sheet material by first hot rolling to substantially twice the desired gauge, then cold rolling substantially to the desired gauge, and then finishing, the finishing steps consisting in etching the cold rolled material by treatment thereof with a solution containing sulphuric acid and sodium nitrate, and box annealing the material.

3. In the process of finishing cold rolled ferrous sheets, strips or the like material, the steps consisting in etching or corroding the cold rolled material by treatment with a solution containing the nitric acid radical in active form, and then annealing the etched material at a temperature below that at which objectionable grain growth occurs.

4. In the process of finishing cold rolled ferrous sheets, strips or the like material, the steps consisting in etching or corroding the cold rolled material in a bath containing sodium nitrate and sulphuric acid in solution, and then box annealing the material at a temperature of about 1200° to 1300° F.

5. The process of producing ferrous sheet material, comprising the steps of hot rolling the material into sheet form, pickling the sheets to remove the scale produced in hot rolling, cold rolling the pickled sheets to produce a fine crushed grain structure and a highly finished glossed surface, immersing the sheets in an acid etching bath to produce a dull surface finish, and so annealing the dull finished sheets as to remove the cold rolling strains without causing objectionable grain growth.

6. The process of producing ferrous sheet material, comprising the steps of hot rolling the material into sheet form, pickling the sheets to remove the scale produced in hot rolling, cold rolling the pickled sheets to produce a fine crushed grain structure and a highly finished glossed surface, immersing the sheets in an acid etching bath containing sulphuric acid and the nitric acid radical to produce a dull surface finish, and so annealing the dull finished sheets as to remove the cold rolling strains without causing objectionable grain growth.

7. The process of producing ferrous sheet material, comprising the steps of hot rolling the material into sheet form, pickling the sheets to remove the scale produced in hot rolling, cold rolling the pickled sheets to produce a fine crushed grain structure and a highly finished glossed surface, immersing the sheets in an acid etching bath to produce a dull surface finish, so annealing the dull finished sheets as to remove the cold rolling strains without causing objectionable grain growth, and lightly cold rolling the thus annealed sheets.

8. The process of producing ferrous sheet material, comprising the steps of hot rolling the material into sheet form, pickling the sheets to remove the scale produced in hot rolling, cold rolling the pickled sheets to produce a fine crushed grain structure and a highly finished glossed surface, etching the sheets to produce a dull surface finish, and so annealing the dull finished sheets as to remove the cold rolling strains without causing objectionable grain growth.

9. The process of producing ferrous sheet material, which comprises the steps of hot rolling the material into sheet form, pickling the sheets to remove the scale produced in hot rolling, cold rolling the pickled sheets to produce a highly finished glossed surface, etching the sheets to produce a dull surface finish, and annealing the dull finished sheets.

10. The process of producing ferrous sheet material, which comprises the steps of hot rolling the material into sheet form, pickling the sheets to remove the scale produced in hot rolling, cold rolling the pickled sheets to produce a highly finished glossed surface, immersing the sheets in an acid etching bath to produce a dull surface finish, and annealing the dull finished sheets.

11. The process of producing ferrous sheet material, which comprises the steps of hot rolling the material into sheet form, pickling the sheets to remove the scale produced in hot rolling, cold rolling the pickled sheets to produce a highly finished glossed surface, immersing the sheet in an etching bath containing the nitric acid radical in active form to produce a dull surface finish, and annealing the dull finished sheets.

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Patented Jan. 12, 1937 **2,067,214**

UNITED STATES PATENT OFFICE

2,067,214

METHOD OF COATING METAL

Robert R. Tanner, Highland Park, and John S. Thompson, Detroit, Mich., assignors, by mesne assignments, to The Patents Corporation, Detroit, Mich., a corporation of Michigan

No Drawing. Application June 24, 1933,
Serial No. 677,458

7 Claims. (Cl. 148—6)

This invention relates to coating metal and more particularly it relates to an improvement in methods by which a substantially integral coating is produced by chemical means upon a metal surface which is thereafter covered with a coat of paint, varnish, enamel or the like which dries or hardens over the chemical coat and is hereinafter referred to for brevity as a siccative coat.

It is known that various treatments will produce a substantially integral coat upon metal by chemical changes in the surface of the metal which result in firmer adherence of a siccative coat thereto than can be obtained by direct application of the siccative coat upon bare metal. This has been practiced to a considerable extent, particularly with iron and steel, by the production on iron and steel of a phosphate coating as a foundation or bond for paint or the like. Similar phosphate coats may be produced upon zinc or magnesium, and by somewhat similar treatments substantially insoluble salts of the metals may be produced by treatment with organic acids including the dicarboxylic and hydroxy-dicarboxylic acids of the aliphatic series and carboxylic acids, having but one carboxyl group, and sulphonic acids of the aromatic series, particularly where oxidizing agents and copper compounds or the like are employed as accelerators. By proper manipulation, such salt coatings can be produced not only upon iron and zinc, but also upon tin, lead and copper. These various coatings, when formed so that they are firmly adherent and substantially integral coatings upon the metal, greatly increase the adherence of siccative coats to the metal. Also proper chemical treatment produces oxide coats on substantially all metals, and siccative coats adhere to such oxide coats better than to the bare metal. Similar increased adherence may be secured on aluminum by a coating of lithium aluminate or aluminum fluoride. The nitric acid radical generally facilitates the production of oxide coatings on metal and also the production of integral salt coats of the kind described above. These various bonding coats are hereinafter referred to for brevity as chemical coats.

While the adherence of siccative coats to the metal is greatly increased by the bonding effect of a chemical coat, it has been found difficult to avoid blisters between the chemical coat and the siccative coat, where the chemical coat has been produced with the aid of the NO_3 radical, particularly when the finished surface is subjected to humidity tests.

The object of the present invention is to provide an intermediate treatment after the production of the chemical coat and before the application of the siccative coat, whereby this blistering under the siccative coat is minimized or eliminated.

After the production of the chemical coat, the surface is customarily washed before the application of the siccative coat. In accordance with the present invention, the chemical coat is preferably rinsed in the usual manner and is then treated with a dilute solution of chromic acid, phosphoric acid or oxalic acid. Treatment with dilute solutions of other acids, with a few exceptions such as nitric acid, reduces to some extent the blistering but not as effectively and satisfactorily as the acids named. A treatment in a dilute solution of nitric acid seems to increase rather than decrease the blistering.

The three acids named above are preferred in the order in which they are named, the chromic acid being decidedly preferable, phosphoric acid being next in efficiency, and oxalic acid being not so desirable but still effective to materially reduce the blistering.

In the preferred form, the chromic acid solution is formed by introducing from 2 grams to 20 grams of chromic acid in a gallon of water. For ordinary commercial purposes about 4 grams of chromic acid to a gallon of water is preferred, but fairly good results may be obtained with a dilution as great as 2 grams in a gallon of water, and while a strength greater than 4 grams to a gallon of water seems unnecessary, it seems to do little, if any, harm until 20 grams or over are used. Stronger solutions of chromic acid are likely to injure the chemical coat, and even with 20 grams to the gallon undesirable yellow streaks develop although these streaks do not seem to affect the adherence of the siccative coat.

It is preferable to employ the customary rinsing after the production of the chemical coat and before the use of the chromic acid rinse, so as to avoid contamination of the chromic acid rinse. No treatment is necessary after the chromic acid rinse and before the application of the siccative coating. If any subsequent rinsing takes place, it should be with distilled water or at least with water which does not contain lime, alkali or other material which may result in contaminating the chemical coat sufficiently to produce blisters.

The length of treatment in the chromic acid rinse depends upon the strength of the solution employed, the condition of the work and the temperature of the rinsing bath. Preferably the bath is employed at a temperature approaching the boiling point and, with the strength mentioned, one minute or less in the bath is ordinarily sufficient.

When a phosphate solution is employed, it may be used hot in a solution having a strength which requires between ¼ cc. and ½ cc. tenth normal caustic soda to neutralize 10 cc. of the rinse water, methyl orange being the indicator. Where this rinse water is employed over a phosphate chemical coat, it gradually becomes contaminated with phosphates and is not effective where the phosphate builds up so that it requires more than four times as much alkali to neutralize a given amount of solution with phenolphthalein as an indicator than it does to neutralize the same amount of solution with methyl orange as an indicator. About one minute treatment in such a phosphoric acid rinse is ordinarily sufficient.

Where an oxalic acid rinse is employed, it should be used hot in approximately corresponding strength to that indicated above for the phosphoric acid solution.

The acid rinse to minimize or eliminate blisters under a siccative coat is particularly effective when employed with a chemical coat produced by a phosphate solution containing nitrates, but is also effective with the other chemical coats mentioned above, which are obtained by means of solutions containing NO_3 radical. Also, while the most important use of the method at the present time is in connection with coating iron or steel, it is also effective with the chemical coats produced upon other metals, as mentioned above.

What is claimed is:

1. The method which consists in producing on a metal surface a chemical coating by means of a solution containing the nitric acid radical, rinsing the coated surface with a substantially pure dilute aqueous solution of an acid in the group consisting of chromic acid, phosphoric acid, and oxalic acid, and thereafter covering said surface with a siccative coat.

2. The method which comprises producing on a metallic surface a phosphate-containing coating by means of a solution containing the NO_3 radical, rinsing the coated surface in a dilute aqueous solution of chromic acid and covering the rinsed surface with a siccative coat.

3. The method which consists in producing on a surface of iron or steel a phosphate coating by means of a solution containing the nitrate radical, rinsing the coated surface in a dilute aqueous solution of chromic acid, and covering the rinsed surface with a siccative coat.

4. A method in accordance with claim 3, and in which the dilute acid rinse is of chromic acid of the order of strength of 4 grams of chromic acid to one gallon of water.

5. A method in accordance with claim 1, and in which the acid rinse is a solution of oxalic acid requiring between one-fourth cc. and one-half cc. tenth normal caustic soda to neutralize 10 cc. of the solution, methyl orange being the indicator.

6. A method in accordance with claim 1, and in which the acid rinse is a solution of phosphoric acid requiring between one-fourth cc. and one-half cc. tenth normal caustic soda to neutralize 10 cc. of the solution, methyl orange being the indicator, and requiring not more than four times as much alkali to neutralize a given amount of the solution with phenolphthalein as an indicator than with methyl orange as an indicator.

7. The method which consists in coating a metal surface of the group consisting of iron, zinc and their alloys, by means of a phosphate solution containing the nitric acid radical, rinsing the coated surface in a phosphoric acid solution requiring not more than one-half cc. tenth normal caustic soda to neutralize 10 cc. of the solution, methyl orange being the indicator, and not more than four times as much alkali to neutralize the solution with phenolphthalein as the indicator than with methyl orange as the indicator.

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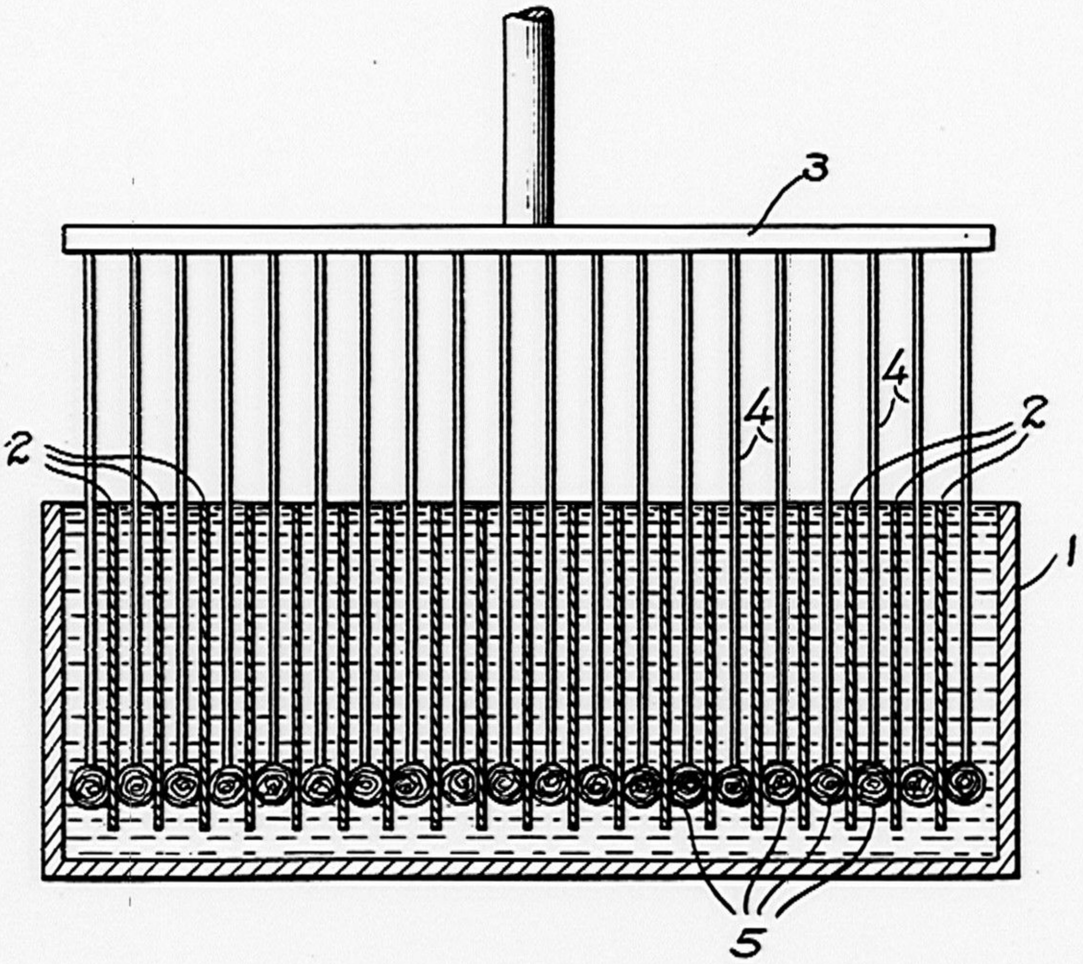
JOHN S. THOMPSON.

Nov. 12, 1929. W. H. ALLEN **Re. 17,484**

RUSTPROOFING PROCESS

Original Filed May 7, 1926



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Reissued Nov. 12, 1929 **Re. 17,484**

UNITED STATES PATENT OFFICE

WILLIAM H. ALLEN, OF DETROIT, MICHIGAN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO PARKER RUST PROOF COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN

RUSTPROOFING PROCESS

Original No. 1,654,716, dated January 3, 1928, Serial No. 107,384, filed May 7, 1926. Application for reissue filed November 9, 1928. Serial No. 318,289.

The present invention relates to the treatment of ferrous metals to protect them against rusting and relates specifically to improvements in rust proofing processes such as set out in the patent to Coslett 870,937 of Nov. 12, 1907.

In the practice of the Coslett process iron or steel articles are placed in a boiling bath containing water, phosphoric acid and iron filings and allowed to remain for a time. The articles in this treatment acquire a coating of phosphate of iron which adheres firmly and affords protection of the article against the oxidizing action of air and moisture.

In carrying out the outlined process on articles which are subsequently to be enameled, it has been found that such articles, especially metal sheets, frequently have their surfaces so roughened by the coating that, when enameled, they do not present the desirable smooth polished surface.

It is among the objects of the present invention therefore to prevent this rough deposit and produce rust proofed articles which are quite smooth on their surfaces and which, when subsequently enameled shall present the characteristic smooth polished surface.

Another object is means by which such operation may be accomplished.

With these and other objects in view as will readily appear to those skilled in the art the invention consists in causing inert bodies of suitable nature to contact with the surfaces of the article being treated so as to agitate the comparatively quiescent layer of solution at this location thereby allowing better action of the solution and also preventing crystal growth.

Referring to the drawing, the figure is a more or less diagrammatic representation, one form of an apparatus by means of which the operation is carried out.

In the drawing, 1 indicates a tank or vat in which the solution of water phosphoric acid and iron filings is first boiled. Indicated at 2 are metal sheets to be coated with the phosphate. These may be placed in suitable racks or cages (not shown) and are preferably evenly spaced as indicated.

Above the tank 1 and adapted to be raised and lowered is a frame 3 carrying a series of rods 4 carrying at their lower ends pads or rolls 5 of material unaffected by the solution. These pads 5 will be long enough to extend the full width of the sheets 2 and large enough to rub lightly the adjacent surfaces of two sheets.

These pads or rolls are preferably of cotton cloth or covered with this material but it is obvious other materials may be used. It is also obvious that other means than the specific apparatus shown may be used for the operation which consists in slowly and lightly rubbing the surface of the article during the rust proofing treatment.

In carrying out the improved process, the solution is first heated to boiling and the plates placed therein. Then while the heating is continued, the frame 3 is slowly moved up and down until the coating has progressed to a suitable degree. The plates are then removed and dried.

Having now described the invention and the preferred form of embodiment thereof it is to be understood that the said invention is not to be limited to the specific details herein described and shown but only by the scope of the claims which follow.

I claim:

1. The process which consists in treating iron or steel articles with a rust proofing solution adapted to form an iron compound upon the surface of said articles and at the same time subjecting said articles to a treatment to prevent crystal growth upon the said surfaces.

2. The process which consists in treating iron or steel articles with a rust proofing solution adapted to form an iron phosphate upon the surface of said articles and at the same time subjecting said articles to a treatment to prevent crystal growth upon the said surfaces.

3. The process which consists in treating iron or steel articles with a rust proofing solution adapted to form an iron compound upon the surface of said articles and at the same time rubbing lightly the surfaces of

the articles with pads of material inert to the solution and coating.

4. The process which consists in treating iron or steel articles with a rust proofing solution adapted to form an iron compound upon the surface of said articles and at the same time disturbing the comparatively quiescent layer of solution adjacent said surfaces by moving in contact with said surfaces bodies of inert solid material.

5. The process which consists in treating iron or steel articles with a rust proofing solution adapted to form an iron phosphate upon the surface of said articles and at the same time disturbing the comparatively quiescent layer of solution adjacent said surfaces by moving in contact with said surfaces bodies of inert solid material.

WILLIAM H. ALLEN.

UNITED STATES
COURT OF APPEALS FOR THE
DISTRICT OF COLUMBIA

FILED JAN 12 [illegible]

Joseph W. Stewart

CLERK

BRIEF FOR APPELLEE

United States Court of Appeals for the District of Columbia

APPEAL NO. 8309

JOHN S. THOMPSON AND HAROLD J. MCVEY, APPELLANTS

v.

CONWAY P. COE, COMMISSIONER OF PATENTS, APPELLEE

APPEAL FROM THE JUDGMENT OF THE DISTRICT COURT OF THE UNITED STATES FOR THE DISTRICT OF COLUMBIA

W. W. COCHRAN,
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In the United States Court of Appeals for the District of Columbia

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APPEAL NO. 8309

JOHN S. THOMPSON AND HAROLD J. MCVEY, APPELLANTS

v.

CONWAY P. COE, COMMISSIONER OF PATENTS, APPELLEE

APPEAL FROM THE JUDGMENT OF THE DISTRICT COURT OF THE UNITED STATES FOR THE DISTRICT OF COLUMBIA

BRIEF FOR THE COMMISSIONER OF PATENTS

This is an appeal from the Judgment (71)[1] of the District Court of the United States for the District of Columbia dismissing a Complaint (1) brought by appellants to obtain the issuance of a patent on their application No. 138,868 (79) which was filed in the Patent Office on April 26, 1937.

APPELLANTS' APPLICATION

Appellants' application and the claims on appeal relate to a method of rust-proofing metal objects and, in particular metal sheets. In the method a metal sheet 20 (88) is first subjected to a spray of water coming from a pipe 21 and immediately thereafter is passed between rolls 16 and 17 which operate to squeeze the water into both sides of the metal sheet and thus thoroughly wet the same. The sheet is then passed into a bath of rust-proofing solution 14. On emmerging from the bath the sheet passes between a series of rolls. Finally the sheet is rinsed in a solution containing one of the following group of materials: chromic acid, phosphoric acid, oxalic acid, and mixtures of the same.

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[1] The numbers in parentheses refer to pages in Appellants' Appendix.

SUMMARY OF ARGUMENT

I. The only means disclosed in appellants' application for wetting the metal sheet is a pair of rolls between which the sheet is passed. It was not shown by the evidence that a mere breaking down of the surface tension of the water on the rolls by some mechanical means would be effective in the claimed method or that the rolls actually break down the surface tension. Appellants admit that they do not know just what is the the explanation of the action of the rolls on the sheet. Claims 20, 21, and 25, which are not limited to the use of rolls, are therefore broader than the disclosure of the alleged invention.

II. The prior art in evidence discloses instances of the use of rolls on a wet metal sheet just prior to the passing of the sheet into a water solution of a treating material. This procedure inherently has the same advantage as is present in appellants' method, of squeezing the water into the surfaces of the sheet whereby the treating solution will quickly and uniformly attack the surfaces of the sheet. Such procedure being old it was not invention to use it in a rust-proofing method.

III. The last clause of claim 26 recites the step of rinsing in a mixture of various acids. This clause does not impart patentability to the claim because the step is shown in the prior art and appellants do not contend that there is anything new in their method except the use of wet rolls on the metal sheet just before it is immersed in the rust-proofing solution.

ARGUMENT

I

Appellants' Claims 20, 21, and 25

Claims 20, 21, and 25 (2, 3) are not limited to the use of rolls for operating on the opposite sides of the metal object. Claims 20 and 21 recite mechanical means for breaking down the surface tension of the water to effect a wetting of the surface, and claim 25 merely states that the wetting is done by mechanical means. The only means disclosed in appellants' application for operating on the sheet are rolls and this is admitted by appellants on page 15 of their brief. No evidence was submitted to show that any other means than rolls would be effective to accomplish such a wetting of the sheet as is apparently necessary in appellants' method. Moreover there was no evidence to show that a mere breaking down of the surface tension of the water by mechanical or other means would accomplish the desired result in preparing the sheet for treatment by the rust-proofing solution. Further, there was no evidence even to show that the rolls actually would break down the surface tension of the water. In fact, appellant Thompson (39) testified that so far as he knew a squeezing action on the sheet is required. He further testified (40) that he did not know exactly what is the reason why appellants get the result they do, but merely that they get the desired result when the sheet is passed between the rolls in a moist condition. It therefore seems clear that appellants' disclosure can form no basis for the allowance of claims which are not limited to the use of rolls, the only means disclosed in their application for accomplishing the desired result.

As was stated in *Hildreth* v. *Lauer & Suter Co.,* 204 Fed. 792:

> It is hornbook law that a claim which covers more than the patentee really invented is invalid.

And as was said by this Court in *In re Carr,* 297 Fed. 542, 54 App. D. C. 283:

> * * * there is no reason, as we have many times observed, why an applicant in the Patent Office should not draw his claims to cover his actual invention only.

Claims 20, 21, and 25 are therefore obviously broader than appellants' alleged invention.

II

Appellants' Claims 22, 23, and 24

Claims 22, 23, and 24 (2, 3) recite the use of rolls for squeezing water into the surfaces of the sheet for the purpose, as stated in claim 25 (3), of preparing the sheet so that the rust-proofing compound will immediately and uniformly affect the entire surface of the sheet. The prior art shows that the use of rolls in preparing a metal sheet for surface treatment is common.

The patent to Thomas et al., No. 1,360,819, November 30, 1920 (137), discloses a method of tinning metal plates. As will be seen from Fig. 1 of this patent, the plates are removed, one at a time, from a pile 1 and passed through a pickling bath 7. The plates are next "swilled"; that is, drenched with water by jets coming from pipes 10 which are arranged between sets of rolls 9. Finally, the plates are fed into the tin-pot 11 by guide rolls 12.

The Spear patent, No. 244,153, July 12, 1881 (137), discloses a process of galvanizing metal sheets. At one stage in the process the sheets coming out of the water tank C, in which they are scrubbed by brushes, pass between rubber rollers C^2, which remove excess water. The sheets then enter a tank D containing a strong aqueous solution of zinc chloride. The purpose of this solution is to produce a surface on the sheet which will readily receive the final zinc coating. On leaving the tank D the sheets pass between rollers d′, which remove the surplus solution adhering thereto.

The Shonkwiler et al. patent, No. 1,946,766, February 13, 1934 (137), discloses an apparatus and method for producing a surface on a metal sheet, which will readily take and hold a coat of paint. The sheet coming off the roll C is sprayed with alkali or water coming from the pipes 6 for the purpose of removing the oil which is usually found on the sheet. Next the sheet goes between the brushes 7 and wringer rolls 8 and then into the etching bath 10, which is an aqueous solution of nitric acid. Coming out of the etching bath the sheet is again sprayed and scrubbed and passed between wringer rolls 14 and cut into pieces of proper size.

It seems obvious that in the methods disclosed in the Spear and Shonkwiler et al. patents the procedure of passing the wet sheet between wringer rolls has inherently the same advantage in preparing the surface of the sheet for treatment as the same procedure has in appellants' method. In all methods of treating the surface of a sheet by an aqueous solution of a treating material, it is advantageous to have the surface of the sheet thoroughly wet before it is treated so that the treating material can act quickly and uniformly over the whole sheet. While it is true that appellant Thompson testified (41) that it was not, so far as he knew, the practice to wet an object before applying an aqueous solution of a treating material thereto, it nevertheless would seem to be an obvious thing to do. In any event, the same step is carried out in the Spear and Shonkwiler et al. patents with the same advantageous result. The fact that Spear and Shonkwiler et al. may not have described the effect or even realized the advantage of the procedure is not material. Even though the appellants may have been first to discover and describe the advantage of the procedure disclosed in the prior patents, it does not follow that they have made a patentable invention. The disclosure of a new and analogous function for an old machine is not a patentable invention. *In re McNeil and Sturtevant,* 28 App. D. C. 461. The law is plain, that the discovery that an old process possesses an unexpected advantage or accomplishes an unexpected result does not entitle one who points out that fact to a patent. *Red River Refining Co.* v. *Sun Oil Co.,* 29 Fed. Supp. 637, 640, affirmed 112 F. (2d) 575.

Although appellants do not contend that there is anything new in their method except the use of the wringer rolls on a wet sheet, yet neither of them testified as to which of them suggested the use of such rolls, and appellant McVey testified (55) that in his mind there was no way of knowing who suggested it. Since the use of rolls is the essence of the alleged invention it seems strange that the origin of the idea of using them should be so obscure. Since both appellants are admittedly skilled in the art of treating metal sheets, it seems reasonable to suppose that the suggestion of using rubber rolls came from the widespread use of such rolls in the art.

These claims, as well as claims 20, 21, and 25, it is submitted, are clearly unpatentable in view of the teaching of the Spear and Shonkwiler et al. patents.

III

Appellants' Claim 26

Claim 26 (3) contains the additional limitation that the sheet is finally rinsed in a solution containing one of several specified acids or mixtures thereof. The use of such a rinse containing the same acids is clearly disclosed in the patent to Tanner et al., No. 2,067,214 (137) and appellant Thompson admitted (45) that the use of such acids in a rinse was not new and that the success of appellants' method does not depend on such a rinse. It is clear therefore that the recitation of such a rinse does not impart patentability to this claim, which is otherwise similar to claims 22, 23, and 24.

CONCLUSION

It is submitted that at most appellants have merely pointed out the advantage inherent in the use of rubber rolls on a wet metal sheet preparatory to treating the same with an acqueous solution of treating material and, therefore, under the authorities they have not made a patentable invention. The Judgment of the District Court should be affirmed.

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Appeal No. 8309.

THOMPSON AND McVEY,

v.

COE.

REPLY BRIEF.

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REPLY BRIEF.

Appellee persists in ignoring the fact that the invention claimed in the application is not merely the use of rolls on a wet sheet. It is more than that, it consists of two steps, (1) wetting the surfaces of the sheets by squeezing the water against them with the rolls or equivalent mechanical means, and (2) immediately subjecting the sheets to the rust-proofing solution while they are so wetted where a chemical reaction occurs that provides a coating. Both steps are essential and they are of equal importance.

In the prior patents to Thomas et al, Speer, and Shonkwiler et al, relied upon by Appellee, merely wetting of the sheet with water is of no consequence whatever and is not required. In each of those cases, the surface of the sheet is wet with water in order to clean it; it is not wet for the purpose of providing a wetted sheet for a subsequent chemical reaction as in the application in suit. In the prior patents referred to, if the sheets were not dirty and did not require cleaning, there would be no necessity for wetting them. In the invention of the application at issue, the sheet must be wetted in the manner described regardless of whether it is clean. Even if the sheet were perfectly clean, it still would have to be wetted in the manner described in order to successfully employ the process of the application. In the prior patents referred to, the use of the rollers is to remove water from the sheets. In the invention of the application in suit, the contrary is the case. There is no necessity for removing water from the sheet; the necessity is to apply water in such a manner that the sheet will be thoroughly wetted.

Appellee's statement, on page 6 of his brief, "In all methods of treating the surface of a sheet by an aqueous solution of a treating material, it is advantageous to have the surface of the sheet thoroughly wet before it is treated so that the treating material can act quickly and uniformly over the whole sheet.", is completely without evidential support. It is merely counsel's unsupported statement. It is quite obvious that it would not always be advantageous to wet the surface of a sheet before treating it with an aqueous solution. Such wetting might so dilute the solution as to make it inoperative, or it might otherwise so alter conditions as to hinder or prevent the desired treatment. In any case, merely wetting the surface of the sheet is not what applicants have claimed. As pointed out, their invention is a process consisting of two principal steps—pressure wetting the sheet by pressing water into its surface by means of the rolls or equivalent mechanical means, and the while it is so wetted subjecting it to the rust-proofing solution where a chemical reaction immediately occurs.

Appellee's legal propositions that the disclosure of a new and analogous function of an old machine is not a patentable invention, and that the discovery that an old process possesses an unexpected advantage or accomplishes an unexpected result does not entitle one who points it out to a patent, and the cases cited in support, *In re McNeil and Sturtevant,* 28 App. D. C. 641, and *Red River Refining Company* v. *Sun Oil Company,* 29 F. Supp. 637, 640 are not in point. Applicants have not discovered a new and analogous function for an old machine, nor merely that an old process possesses an unexpected advantage or accomplishes an unexpected result. They have discovered a new and different process which is not disclosed in any of the prior patents.

In re McNeil and Sturtevant is not at all like the case at issue. There it clearly appeared that the claims covered merely a reversal of parts to accomplish the same result disclosed in prior patents. In the present case, the process of the application is nowhere disclosed in the prior patents.

In *Red River Refining Company* v. *Sun Oil Company,* it clearly appeared that the alleged invention consisted merely in increasing in degree the vacuum present in carrying out an old and well known process. That was held not to constitute invention because it rested upon the change in degree without any change in kind. In the present case, there is no question of degree. The process is different in purpose, steps employed, and result from any disclosed in the prior patents.

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